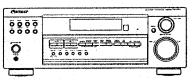
Pioneer sound.vision.soul

Service Manual



VSX-D514-K

ORDER NO.
RRV2901

AUDIO/VIDEO MULTI-CHANNEL RECEIVER

VSX-D514-K
VSX-D514-S
VSX-D414-K
VSX-D414-S

THIS MANUAL IS APPLICABLE TO THE FOLLOWING MODEL(S) AND TYPE(S).

Model	Type	Power Requirement	Remarks
VSX-D514-K	KUCXJI	AC120V	
VSX-D514-S	KUCXJI	AC120V	
VSX-D414-K	KUCXJI	AC120V	
VSX-D414-S	KUCXJI	AC120V	

PIONEER CORPORATION 4-1, Meguro 1-chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS (USA) INC. P.O. Box 1760, Long Beach, CA 90801-1760, U.S.A.
PIONEER EUROPE NV Haven 1087, Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE. LTD. 253 Alexandra Road, #04-01, Singapore 159936
©PIONEER CORPORATION 2004

ZZK FEB. 2004 printed in Japan

SAFETY INFORMATION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING
This product contains lead in solder and certain electrical parts contain chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm.

Health & Safety Code Section 25249.6 – Proposition 65

NOTICE
(FOR CANADIAN MODEL ONLY)
Fuse symbols (fast operating fuse) and/or (slow operating fuse) on PCB indicate that replacement parts must be of identical designation.

REMARQUE
(POUR MODELE CANADIEN SEULEMENT)
Les symboles de fusible (fusible de type rapide) et/ou (fusible de type lent) sur CCI indiquent que les pièces de remplacement doivent avoir la même désignation.

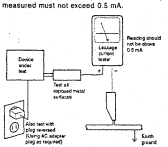
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60 Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5 mA.


Reading should not be above 0.5 mA
Leakage current tester
Device under test
Test all exposed metal surfaces
Also test with plug reversed (Using AC adapter plug as required)
Earth ground
AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a Δ on the schematics and on the parts list in this Service Manual.
The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

[Important symbols for good services]
In this manual, the symbols shown below indicate that adjustments, settings or cleaning should be made securely. When you find the procedures bearing any of the symbols, be sure to fulfill them:

1. Product safety
You should conform to the regulations governing the product (safety, radio and noise, and other regulations), and should keep the safety during servicing by following the safety instructions described in this manual.

2. Adjustments
To keep the original performances of the product, optimum adjustments or specification confirmation is indispensable. In accordance with the procedures or instructions described in the manual, adjustments should be performed.

3. Cleaning
For optical pickups, tape-deck heads, lenses and mirrors used in projection monitors, and other parts requiring cleaning, proper cleaning should be performed to restore their performances.

4. Shipping mode and shipping screws
To protect the product from damages or failures that may be caused during transit, the shipping mode should be set or the shipping screws should be installed before shipping out in accordance with this manual, if necessary.

5. Lubricants, glues, and replacement parts
Appropriately applying grease or glue can maintain the product performances. But improper lubrication or applying glue may lead to failures or trouble in the product. By following the instructions in this manual, be sure to apply the prescribed grease or glue to proper portions by the appropriate amount.For replacement parts or tools, the prescribed ones should be used.

CONTENTS

SAFETY INFORMATION 2
1. SPECIFICATIONS 5
2. EXPLODED VIEWS AND PARTS LIST 8
2.1 PACKING 8
2.2 EXTERIOR SECTION 10
2.3 FRONT PANEL SECTION 12
3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM 14
3.1 BLOCK DIAGRAM 14
3.2 OVERALL WIRING CONNECTION DIAGRAM 16
3.3 MAIN ASSY (1/3) 18
3.4 MAIN ASSY (2/3) 20
3.5 MAIN ASSY (3/3) 22
3.6 DSP ASSY (1/2) 24
3.7 DSP ASSY (2/2) 26
3.8 AMP & PRIMARY (1/2), TRANS2 and TRANS3 ASSYS 28
3.9 AMP & PRIMARY (2/2), REGULATOR, AMP INPUT and TRANS1 ASSYS 30
3.10 VIDEO, 5.1CH, B TO B and S VIDEO ASSYS 32
3.11 FRONT DISPLAY, R, ENCODER, P SW&FUNC KEY and F KEY ASSYS 34
3.12 H.P. and COMPONENT ASSYS 36
4. PCB CONNECTION DIAGRAM 37
4.1 TRANS2, TRANS3 and TRANS1 ASSYS 38
4.2 REGULATOR ASSY 39
4.3 MAIN ASSY 40
4.4 DSP ASSY 44
4.5 AMP & PRIMARY and AMP INPUT ASSYS 46
4.6 F. DISPLAY, R. ENCODER, P. SW & FUNC KEY, H. P. and F. KEY ASSYS 48
4.7 B TO B, VIDEO and 5.1CH ASSYS 56
4.8 S.VIDEO and COMPONENT ASSYS 60
5. PCB PARTS LIST 62
6. ADJUSTMENT 67
7. GENERAL INFORMATION 68
7.1 DIAGNOSIS 68
7.1.1 POWER ON AND OFF INITIAL TIMING CHART 68
7.1.2 IC DATA TRANSMISSION TIMING CHART 70
7.1.3 DETECTION CIRCUIT 71
7.1.4 AMPLIFIER SYSTEM PROTECTION OPERATION SPECIFICATION 72
7.1.5 AMPLIFIER FAILURE DIAGNOSIS FLOW CHART 74
7.1.6 DISASSEMBLY 75
7.2 PARTS 77
7.2.1 IC 77
7.2.2 DISPLAY 86
8. PANEL FACILITIES 88

1. SPECIFICATIONS

Specifications (VSX-D514)

Amplifier Section

Continuous average power output of 100 watts* per channel, min., at 8 ohms, from 20 Hz to 20,000 Hz with no more than 0.2 %** total harmonic distortion (front).

Continuous Power Output (Stereo)
Front ..... 100 W
(20– 20,000 Hz, THD 0.2 %, 8Ω)

Continuous Power Output (Surround)
Front ..... 100 W per channel
(1kHz, THD 1.0 %, 8Ω)
Center ..... 100 W (1kHz, THD 1.0 %, 8Ω)
Surround ..... 100 W per channel
(1kHz, THD 1.0 %, 8Ω)

Input (Sensitivity/Impedance)
CD, DVR/VCR, CD-R/TAPE/MD,
DVD/LD, TV/SAT ..... 200 mV/47 kΩ

Frequency Response
CD, DVR/VCR, CD-R/TAPE/MD, DVD/LD,
TV/SAT ..... 5 Hz to 100,000 Hz +1 -3 dB

Output (Level/Impedance)
DVR/VCR REC, CD-R/TAPE/MD REC
..... 200 mV/2.2 kΩ

Tone Control
BASS ..... ± 6 dB (100 Hz)
TREBLE ..... ± 6 dB (10 kHz)
LOUDNESS ..... +6.5 dB/+3 dB (100 Hz/10 kHz)
(at volume level–50 dB)

Signal-to-Noise Ratio
(IHF, short circuited, A network)
CD, DVR/VCR, CD-R/TAPE/MD,
DVD/LD, TV/SAT ..... 96 dB

Signal-to-Noise Ratio
(EIA, at 1 W (1 kHz))
CD, DVR/VCR, CD-R/TAPE/MD,
DVD/LD, TV/SAT ..... 79 dB

Video Section

Input (Sensitivity/Impedance)
DVR/VCR, DVD/LD, TV/SAT 1 Vp-p/75Ω

Output (Level/Impedance)
DVR/VCR 1 Vp-p/75Ω

Frequency Response
DVR/VCR, DVD/LD,
TV/SAT>MONITOR ..... 5 Hz to 7 MHz +1 -3dB
Signal-to-Noise Ratio ..... 55 dB
Cross Talk ..... 55 dB

FM Tuner Section

Frequency Range ..... 87.5 MHz to 108 MHz
Usable Sensitivity ..... Mono: 13.2 dBf, IHF
(1.3 μV/ 75Ω)
50 dB Quieting Sensitivity ..... Mono: 20.2 dB
(at 85 dBf)
Stereo: 38.8 dBf
Signal-to-Noise Ratio ..... Mono: 73 dB
(at 85 dBf)
Stereo: 70 dB (at 85 dBf)
Distortion ..... Stereo: 0.5 % (1 kHz)
Alternate Channel Selectivity ..... 60 dB
(400 kHz)
Stereo Separation ..... 40 dB (1 kHz)
Frequency Response ..... 30 Hz to 15 kHz
(±1 dB)
Antenna Input (DIN) ..... 75Ω unbalanced

AM Tuner Section

Frequency Range ..... 530 kHz to 1,700 kHz
Sensitivity (IHF, Loop antenna) ..... 350 μV/m
Signal-to-Noise Ratio ..... 50 dB
Antenna ..... Loop antenna

Specifications (VSX-D414)

Miscellaneous

Power Requirements ..... AC 120 V, 60 Hz
Power Consumption ..... 260 W
In Standby ..... 0.5 W
AC Outlet ..... 100 W MAX. (SWITCHED)
Dimensions
..... 420 (W) x 158 (H) x 363 (D) mm
(16-9/16 (W) x 6-1/4 (H) x 15-1/2 (D) in.)
Weight (without package) ..... 9.3 kg
(20.5 lb)

Furnished Parts

AM loop antenna 1
FM wire antenna 1
Dry cell batteries (AA size IEC R6) 2
Remote control 1
Operating instructions 1
Warranty Card 1

Note

Specifications and the design are subject to possible modifications without notice, due to improvements.

* Measured pursuant to the Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifiers.

** Measured by Audio Spectrum Analyzer

Amplifier Section

Continuous Power Output (Stereo RMS)

Front ..... 120 W
(1 kHz, THD 0.2 %, 8Ω)

Continuous Power Output (Surround RMS)

Front ..... 120 W per channel
(1kHz, THD 10 %, 8Ω)
Center ..... 120 W (1kHz, THD 10 %, 8Ω)
Surround ..... 120 W per channel
(1kHz, THD 10 %, 8Ω)

Input (Sensitivity/Impedance)

CD, DVR/VCR, CD-R/TAPE/MD, DVD/LD, TV/SAT ..... 200 mV/47 kΩ

Frequency Response

CD, DVR/VCR, CD-R/TAPE/MD, DVD/LD, TV/SAT ..... 5 Hz to 100,000 Hz ±1 dB

Output (Level/Impedance)

DVR/VCR REC, CD-R/TAPE/MD REC ..... 200 mV/2.2 kΩ

Tone Control

BASS ..... ± 6 dB (100 Hz)
TREBLE ..... ± 6 dB (10 kHz)
LOUDNESS ... +5.5 dB/+3 dB (100 Hz/10 kHz)
(at volume level=50 dB)

Signal-to-Noise Ratio
(IHF, short circuited, A network)

CD, DVR/VCR, CD-R/TAPE/MD, DVD/LD, TV/SAT ..... 96 dB

Signal-to Noise Ratio
[EIA, at 1 W (1 kHz)]

CD, DVR/VCR, CD-R/TAPE/MD, DVD/LD, TV/SAT ..... 79 dB

Video Section

Input (Sensitivity/Impedance)

DVR/VCR, DVD/LD, TV/SAT 1 Vp-p/75Ω

Output (Level/Impedance)

DVR/VCR 1 Vp-p/75Ω

Frequency Response

DVR/VCR, DVD/LD, TV/SAT->MONITOR ..... 5 Hz to 7 MHz ±2 dB
Signal-to-Noise Ratio ..... 55 dB
Cross Talk ..... 55 dB

FM Tuner Section

Frequency Range ..... 87.5 MHz to 108 MHz
Usable Sensitivity ..... Mono: 13.2 dBf, IHF
(1.3 µV/ 75Ω)
50 dB Quieting Sensitivity ..... Mono: 20.2 dBf
Stereo: 38.6 dBf
Signal-to-Noise Ratio ..... Mono: 73 dB
(at 85 dBf)
Stereo: 70 dB (at 85 dBf)
Distortion ..... Stereo: 0.5 % (1 kHz)
Alternate Channel Selectivity ..... 60 dB
(400 kHz)
Stereo Separation ..... 40 dB (1 kHz)
Frequency Response ..... 30 Hz to 15 kHz
(±1 dB)
Antenna Input (DIN) ..... 75 unbalanced

AM Tuner Section

Frequency Range ..... 530 kHz to 1,700 kHz
Sensitivity (IHF, Loop antenna) ..... 350 µV/m
Signal-to-Noise Ratio ..... 50 dB
Antenna ..... Loop antenna

Miscellaneous

Power Requirements ..... AC 120 V,60 Hz
Power Consumption ..... 260 W
In Standby ..... 0.5 W
AC Outlet ..... 100 W MAX. (SWITCHED)
Dimensions
..... 420 (W) x 158 (H) x 363 (D) mm
(16-9/16 (W) x 6-1/4 (H) x 15-1/2 (D) in.)
Weight (without package) ..... 9.3 kg
(20.5 lb)

Furnished Parts

AM loop antenna 1
FM wire antenna 1
Dry cell batteries (AA size IEC R6) 2
Remote control 1
Operating instructions 1
Warranty Card 1

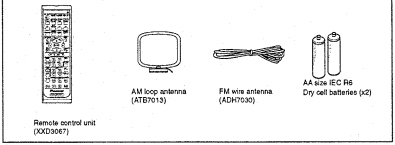
Note

Specifications and the design are subject to possible modifications without notice, due to improvements.

* Measured pursuant to the Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifiers.

** Measured by Audio Spectrum Analyzer

Accessories

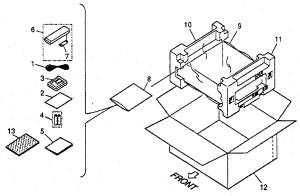


Remote control unit (XXD3067)
AM loop antenna (ATB7013)
FM wire antenna (ADH7030)
AA size IEC R6 Dry cell batteries (x2)

2. EXPLODED VIEWS AND PARTS LIST

NOTES:
- *Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Screws adjacent to ▼ mark on product are used for disassembly.*
- *For the applying amount of lubricants or glue, follow the instructions in this manual. (In the case of no amount instructions, apply as you think it appropriate.)*

2.1 PACKING



PACKING parts List

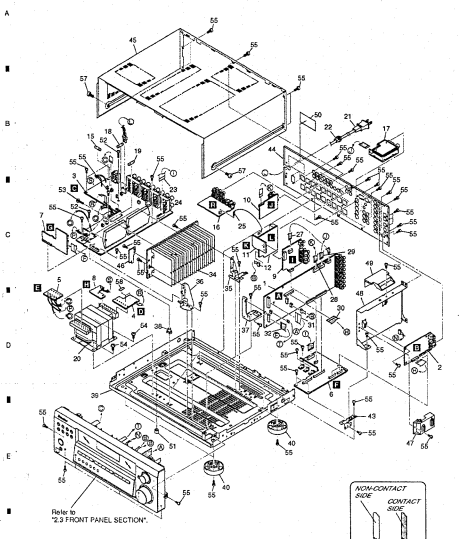
Mark	No.	Description	Part No.
	1	FM wire antenna	ADH7030
NSP	2	Warranty Card	ARY7045
	3	AM loop antenna	ATB7013
NSP	4	Dry cell batteries (AA/R6)	VEM1031
	5	Operating instructions (English)	XRE3077
	6	Remote Control Unit	XXD3067
	7	Battery Cover	XZN3139
NSP	8	Literature Bag	AHG1180
	9	Packing Sheet	AHG7069
	10	Left Pad V1	XHA3141
	11	Right Pad V1	XHA3142
	12	Packing Case	See Contrast table(2)
NSP	13	Accessory Board	XHB3008

(2) CONTRAST TABLE

VSX-D514-K/KUCXJI, VSX-D514-S/KUCXJI, VSX-D414-K/KUCXJI and VSX-D414-S/KUCXJI are constructed the same except for the following :

Mark	No.	Symbol and Description	VSX-D514-K/ KUCXJI	VSX-D514-S/ KUCXJI	VSX-D414-K/ KUCXJI	VSX-D414-S/ KUCXJI
	12	Packing Case	XHD3387	XHD3389	XHD3408	XHD3409

2.2 EXTERIOR SECTION



EXTERIOR SECTION parts List

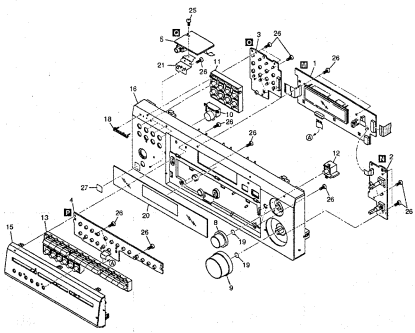
Mark	No.	Description	Part No.
	1	MAIN Assy	See Contrast table(2)
	2	DSP Assy	AWX3418
	3	AMP & PRIMARY Assy	See Contrast table(2)
	4	TRANS2 Assy	XWZ3808
	5	TRANS3 Assy	XWZ3812
	6	REGULATOR Assy	XWZ3796
	7	AMP INPUT Assy	XWZ3800
	8	TRANS1 Assy	XWZ3805
	9	VIDEO Assy	See Contrast table(2)
	10	5.1CH Assy	See Contrast table(2)
	11	B TO B Assy	See Contrast table(2)
	12	S_VIDEO Assy	See Contrast table(2)
	13	********	
	14	********	
⚠	15	FU2 Fuse (8A)	REK1086
	16	COMPONENT Assy	See Contrast table(2)
	17	FM/AM TUNER UNIT	AXX7172
⚠	18	FU1 Fuse (10A)	REK1087
⚠	19	FU701 Fuse (10A)	REK1087
⚠	20	T1 Power Transformer	XTS3084
⚠	21	AC Power Cord	ADG7024
	22	Cord Stopper	CM-22C
	23	J96 23P F.F.C/30V	XDD3102
	24	********	
	25	J38 5P F.F.C/30V	See Contrast table(2)
	26	********	
	27	J33 11P F.F.C/30V	XDD3150
	28	J48 9P F.F.C/30V	XDD3151
	29	J34 13P F.F.C/30V	XDD3149
	30	J43 19P F.F.C/30V	XDD3126
	31	J31 17P F.F.C/30V	XDD3118
	32	J35 16P F.F.C/30V	XDD3101
	33	********	
NSP	34	Heatsink 0.4	ANH7109
	35	Heat Sink Angle R	ANG7252
	36	Heat Sink Angle F	ANG7251
	37	PCB Angle R6	XNW3073
	38	PCB Mold	AMR2533
NSP	39	Under Base R6	XNA3012
	40	Insulator	PNW2766
	41	********	
	42	********	
	43	REG Support R6	XNG3092
	44	Rear Panel	See Contrast table(2)
	45	Bonnet	See Contrast table(2)
NSP	46	HOLDER Assy	XWZ3819
	47	FFC Holder R6	XMR3072
	48	Shield A R6	XNG3068
	49	FFC Cover R6	XMR3060
NSP	50	N Label	See Contrast table(2)
NSP	51	Spacer	AEB7062
	52	Screw	BBZ30P200FTC
	53	Screw 3x23	XBA3012
	54	Screw	FBT40P080FNI
	55	Screw	BBZ30P080FTC
	56	********	
	57	Screw	See Contrast table(2)
NSP	58	ICP Label	XAX3319

(2) CONTRAST TABLE

VSX-D514-K/KUCXJI, VSX-D514-S/KUCXJI, VSX-D414-K/KUCXJI and VSX-D414-S/KUCXJI are constructed the same except for the following :

Mark	No.	Symbol and Description	VSX-D514-K/ KUCXJI	VSX-D514-S/ KUCXJI	VSX-D414-K/ KUCXJI	VSX-D414-S/ KUCXJI
	1	MAIN ASSY	XWK3116	XWK3116	XWK3148	XWK3148
	3	AMP & PRIMARY ASSY	XWZ3782	XWZ3782	XWZ3894	XWZ3894
	9	VIDEO ASSY	XWZ3823	XWZ3823	XWZ3749	XWZ3749
	10	5.1CH ASSY	XWZ3760	XWZ3760	XWZ3759	XWZ3759
	11	B TO B ASSY	XWZ3781	XWZ3781	Not used	Not used
	12	S VIDEO ASSY	XWZ3774	XWZ3774	Not used	Not used
	16	COMPONENT ASSY	XWZ3777	XWZ3777	Not used	Not used
	25	J38 5P F.F.C/30V	XDD3104	XDD3104	Not used	Not used
	44	Rear Panel 514K	XNG3246	XNG3246	Not used	Not used
	44	Rear Panel 414K	Not used	Not used	XNC3259	XNC3259
	45	Bonnet K V1	XZN3148	Not used	XZN3148	Not used
	45	Bonnet S V1	Not used	XZN3149	Not used	XZN3149
NSP	50	N Label 514S	Not used	XAL3194	Not used	Not used
NSP	50	N Label 414S	Not used	Not used	Not used	XAL3203
	57	Screw	FBT40P060FZK	FBT40P080FNI	FBT40P060FZK	FBT40P080FNI

2.3 FRONT PANEL SECTION



FRONT PANEL SECTION parts List

Mark	No.	Description	Part No.
	1	FRONT DISPLAY ASSY	See Contrast table(2)
	2	R. ENCODER Assy	See Contrast table(2)
	3	P.SW & FUNC. KEY Assy	See Contrast table(2)
	4	FRONT KEY Assy	See Contrast table(2)
	5	H.P. Assy	See Contrast table(2)
	6	********	
	7	********	
	8	JOG Knob	See Contrast table(2)
	9	VOL Knob	See Contrast table(2)
	10	Standby BTN V1	See Contrast table(2)
	11	FUNC BTN V1	See Contrast table(2)
	12	ENTER BTN V1	See Contrast table(2)
	13	Sub BTN V1	See Contrast table(2)
	14	********	
	15	Sub Panel	See Contrast table(2)

Mark	No.	Description	Part No.
	16	FRT Panel	See Contrast table(2)
	17	********	
	18	Pioneer Badge	See Contrast table(2)
NSP	19	C Ring DIM 8.1	XBH3016
	20	D Panel V1	XAK3427
	21	Earth Plate R5 HP	XNG3066
	22	*******	
	23	********	
	24	********	
	25	Screw	BBZ30P080FTC
	26	Screw	BPZ30P100FTC
NSP	27	Energy Star Label	AAX8022

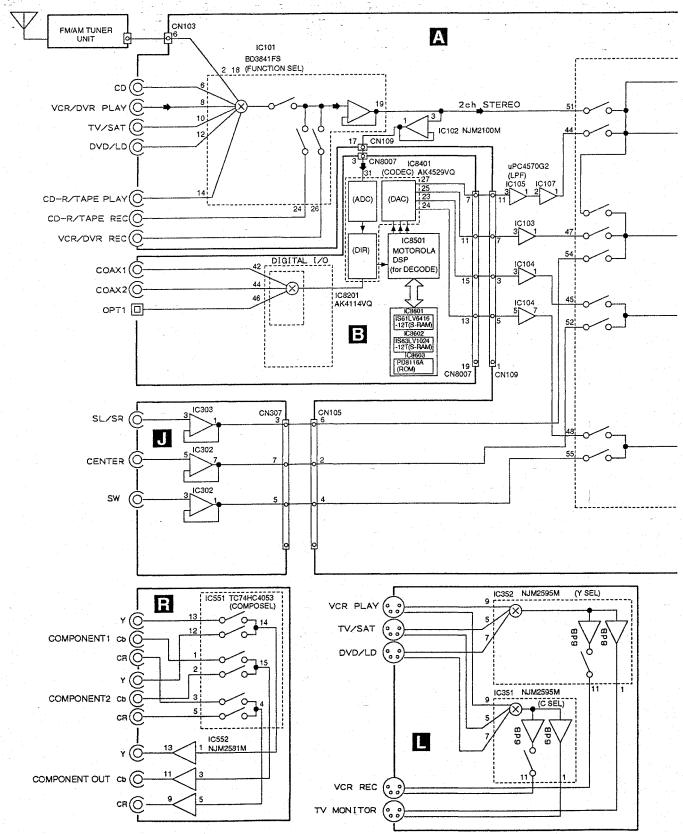
(2) CONTRAST TABLE

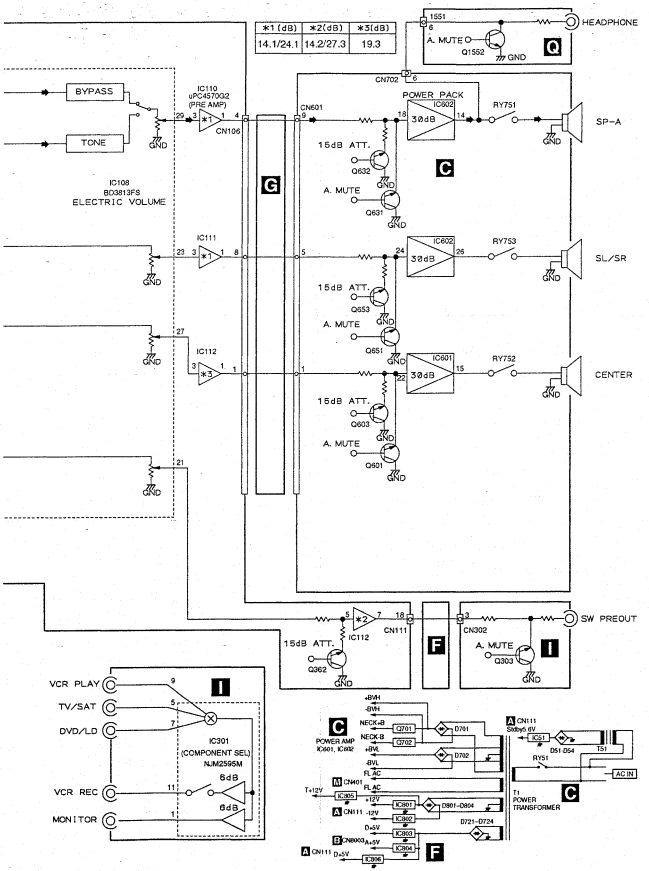
VSX-D514-K/KUCXJI, VSX-D514-S/KUCXJI, VSX-D414-K/KUCXJI and VSX-D414-S/KUCXJI are constructed the same except for the following :

Mark	No.	Symbol and Description	VSX-D514-K/ KUCXJI	VSX-D514-S/ KUCXJI	VSX-D414-K/ KUCXJI	VSX-D414-S/ KUCXJI
	1	FRONT DISPLAY ASSY	XWZ3755	XWZ3755	XWZ3754	XWZ3754
	2	R. ENCODER ASSY	XWZ3766	XWZ3766	XWZ3765	XWZ3765
	3	P.SW & FUNCTION ASSY	XWZ3763	XWZ3763	XWZ3762	XWZ3762
	4	FRONT KEY ASSY	XWZ3758	XWZ3758	XWZ3757	XWZ3757
	5	H.P. ASSY	XWZ3768	XWZ3768	XWZ3767	XWZ3767
	8	JOG Knob V1K	XAB3038	Not used	XAB3038	Not used
	8	JOG Knob V1S	Not used	XAB3042	Not used	XAB3042
	9	VOL Knob V1K	XAB3039	Not used	XAB3039	Not used
	9	VOL Knob V1S	Not used	XAB3043	Not used	XAB3043
	10	Standby BTN V1K	XAD3173	Not used	XAD3173	Not used
	10	Standby BTN V1S	Not used	XAD3178	Not used	XAD3178
	11	FUNC BTN V1K	XAD3174	Not used	XAD3174	Not used
	11	FUNC BTN V1S	Not used	XAD3180	Not used	XAD3180
	12	ENTER BTN V1K	XAD3175	Not used	XAD3175	Not used
	12	ENTER BTN V1S	Not used	XAD3181	Not used	XAD3181
	13	Sub BTN V1K	XAD3176	Not used	XAD3176	Not used
	13	Sub BTN V1S	Not used	XAD3177	Not used	XAD3177
	15	Sub Panel 514K	XAK3425	Not used	XAK3425	Not used
	15	Sub Panel 514S	Not used	XAK3432	Not used	XAK3432
	16	FRT Panel 514K	XMB3138	Not used	Not used	Not used
	16	FRT Panel 514S	Not used	XMB3143	Not used	Not used
	16	FRT Panel 414K	Not used	Not used	XMB3152	Not used
	16	FRT Panel 414S	Not used	Not used	Not used	XMB3153
	18	Pioneer Badge	XAM3096	VAM1129	XAM3096	VAM1129

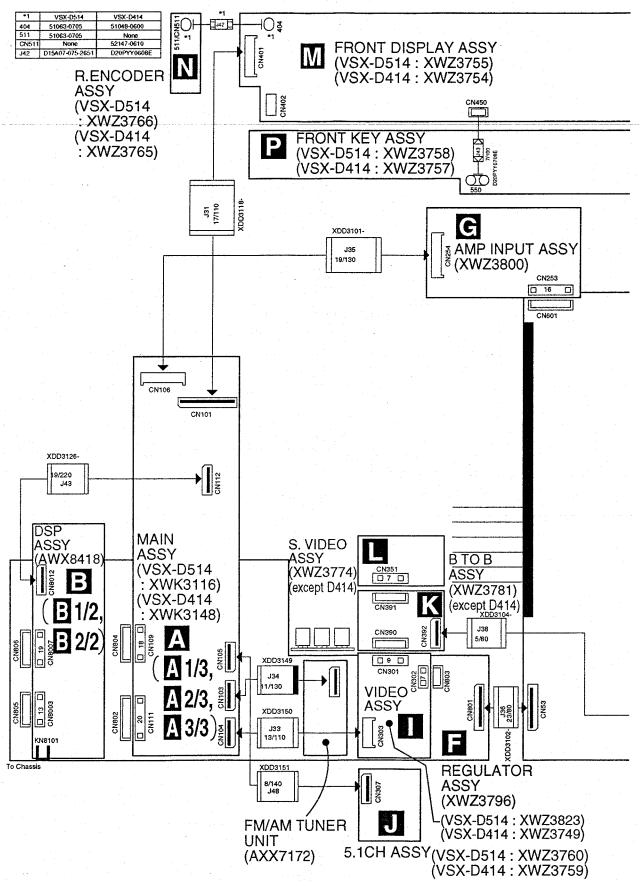
3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

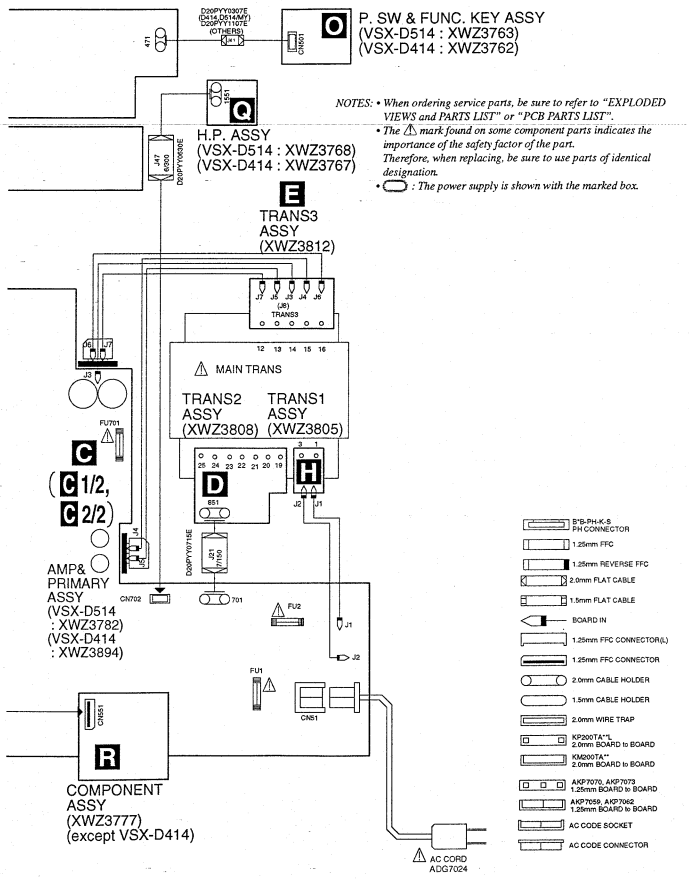
3.1 BLOCK DIAGRAM



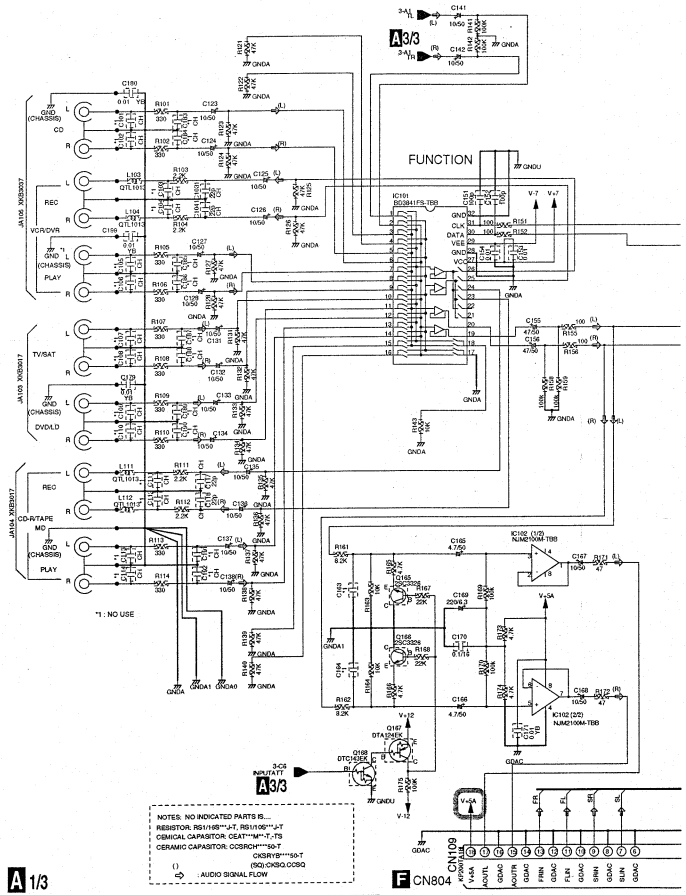


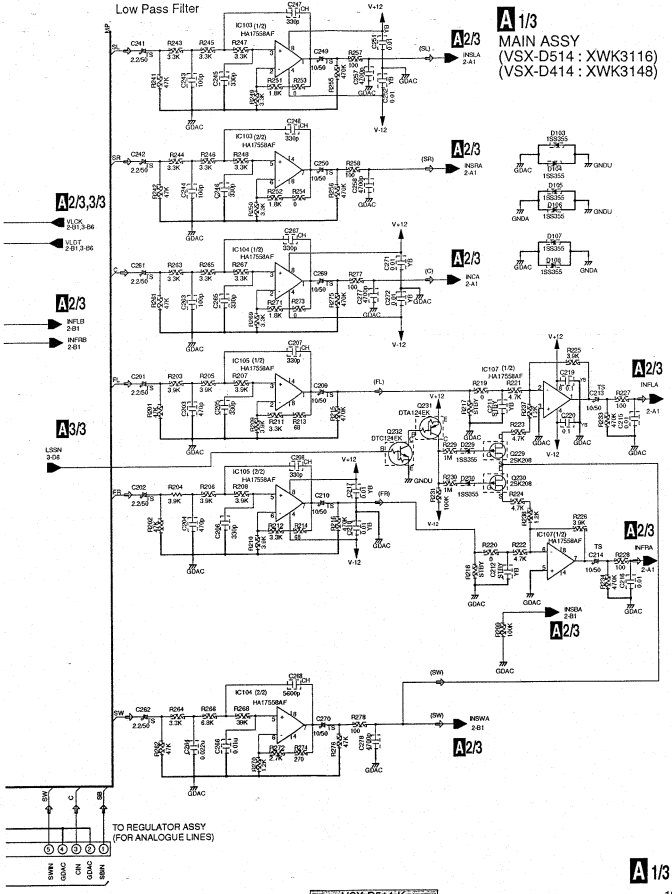
3.2 OVERALL WIRING CONNECTION DIAGRAM



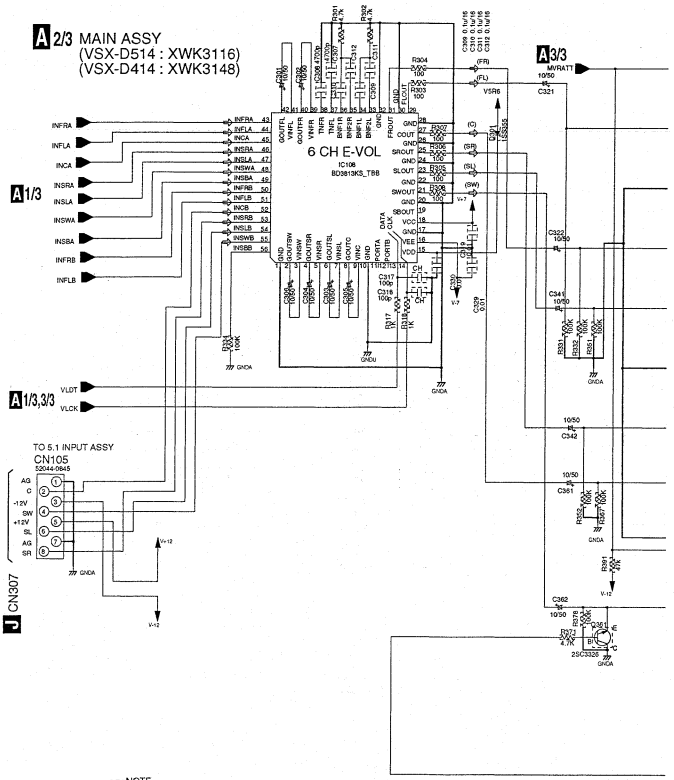

O P. SW & FUNC. KEY ASSY (VSX-D514 : XWZ3763) (VSX-D414 : XWZ3762)
Q H.P. ASSY (VSX-D514 : XWZ3768) (VSX-D414 : XWZ3767)
E TRANS3 ASSY (XWZ3812)
MAIN TRANS
TRANS2 ASSY (XWZ3808)
TRANS1 ASSY (XWZ3805)
C
C 1/2,
C 2/2
D
H
AMP& PRIMARY ASSY (VSX-D514 : XWZ3782) (VSX-D414 : XWZ3894)
R COMPONENT ASSY (XWZ3777) (except VSX-D414)
AC CORD ADG7024
NOTES: • When ordering service parts, be sure to refer to "EXPLODED VIEWS and PARTS LIST" or "PCB PARTS LIST".
• The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
• : The power supply is shown with the marked box.
B*B-PH-K-S PH CONNECTOR
1.25mm FFC
1.25mm REVERSE FFC
2.0mm FLAT CABLE
1.5mm FLAT CABLE
BOARD IN
1.25mm FFC CONNECTOR(L)
1.25mm FFC CONNECTOR
2.0mm CABLE HOLDER
1.5mm CABLE HOLDER
2.0mm WIRE TRAP
KP200TA*'L 2.0mm BOARD to BOARD
KM200TA** 2.0mm BOARD to BOARD
AKP7070, AKP7079 1.25mm BOARD to BOARD
AKP7059, AKP7062 1.25mm BOARD to BOARD
AC CODE SOCKET
AC CODE CONNECTOR

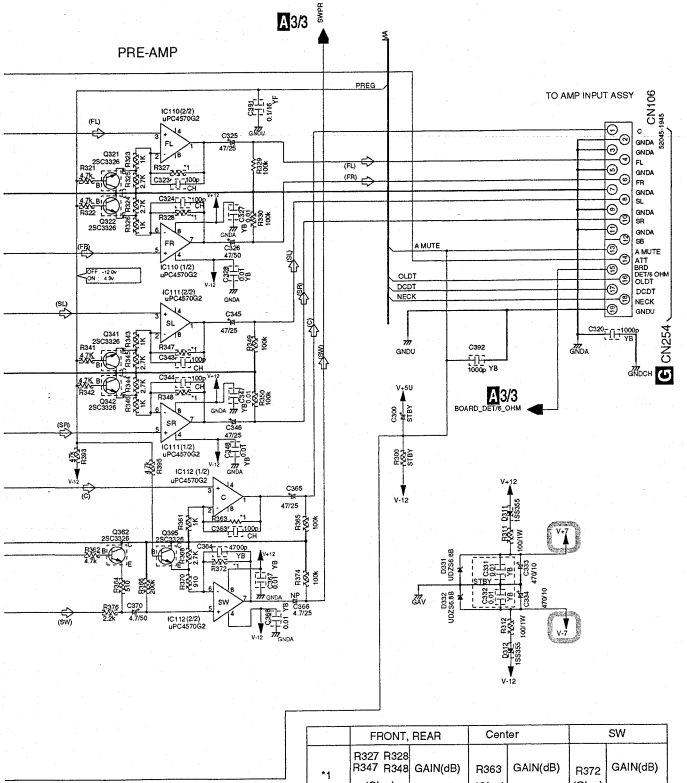
3.3 MAIN ASSY (1/3)





3.4 MAIN ASSY (2/3)

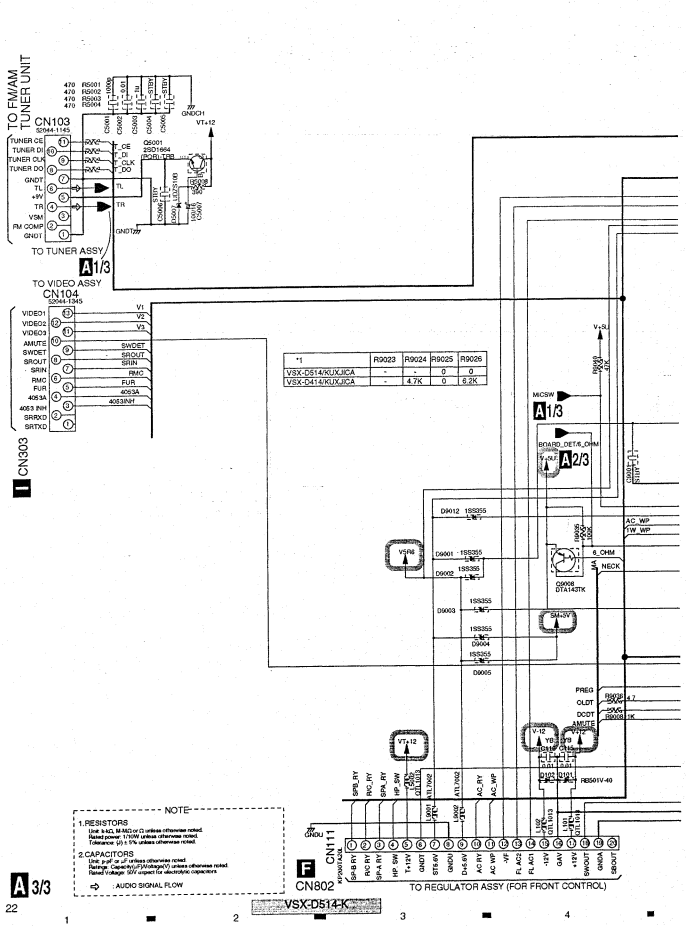


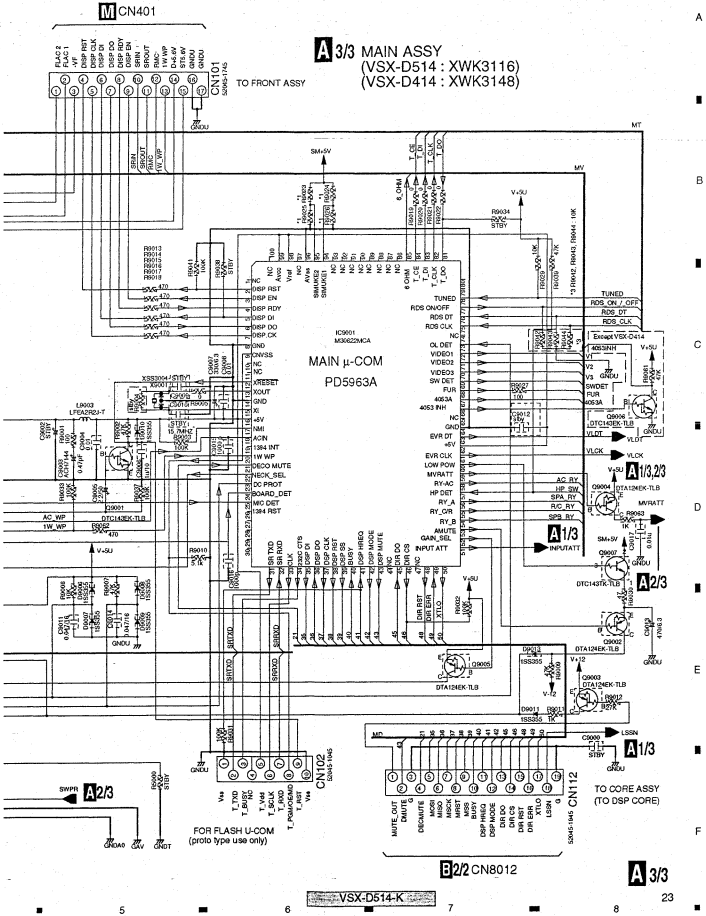


	FRONT, REAR		Center		SW	
*1	R327 R328 R347 R348 (Ohm)	GAIN(dB)	R363 (Ohm)	GAIN(dB)	R372 (Ohm)	GAIN(dB)
	15K	14.1/24.1	8.2K	19.3	15K	14.2/27.3

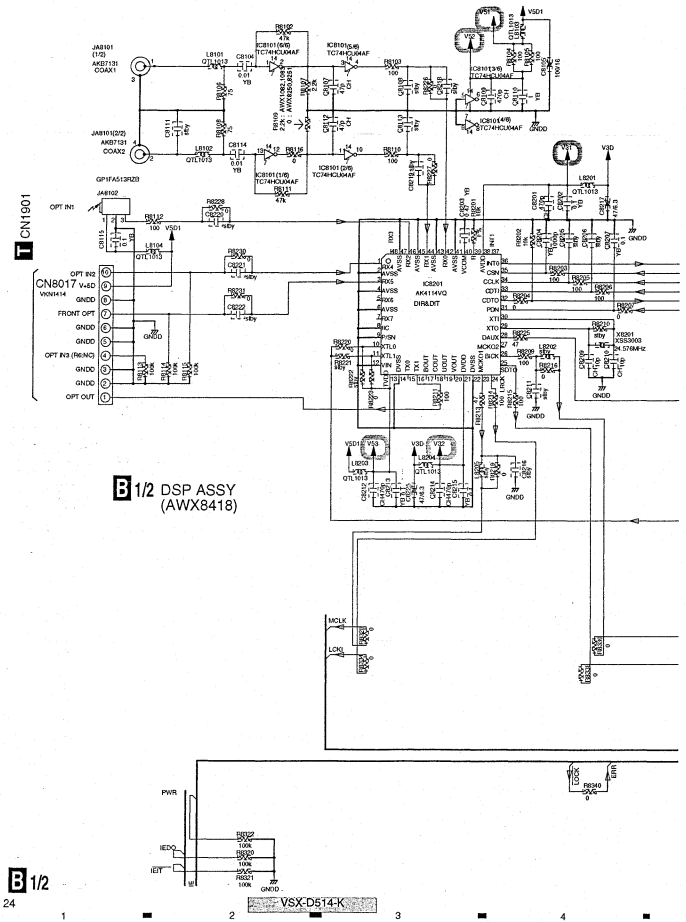
NOTE
1.RESISTORS
Unit: k-kΩ, M-MΩ or Ω unless otherwise noted.
Rated power: 1/10W unless otherwise noted.
Tolerance: (J) ± 5% unless otherwise noted.
2.CAPACITORS
Unit: p-pF or µ-µF unless otherwise noted.
Ratings: Capacity(uF)/Voltage(V) unless otherwise noted.
Rated Voltage: 50V expect for electrolytic capacitors.
JA:CEJA
⇨ : AUDIO SIGNAL FLOW

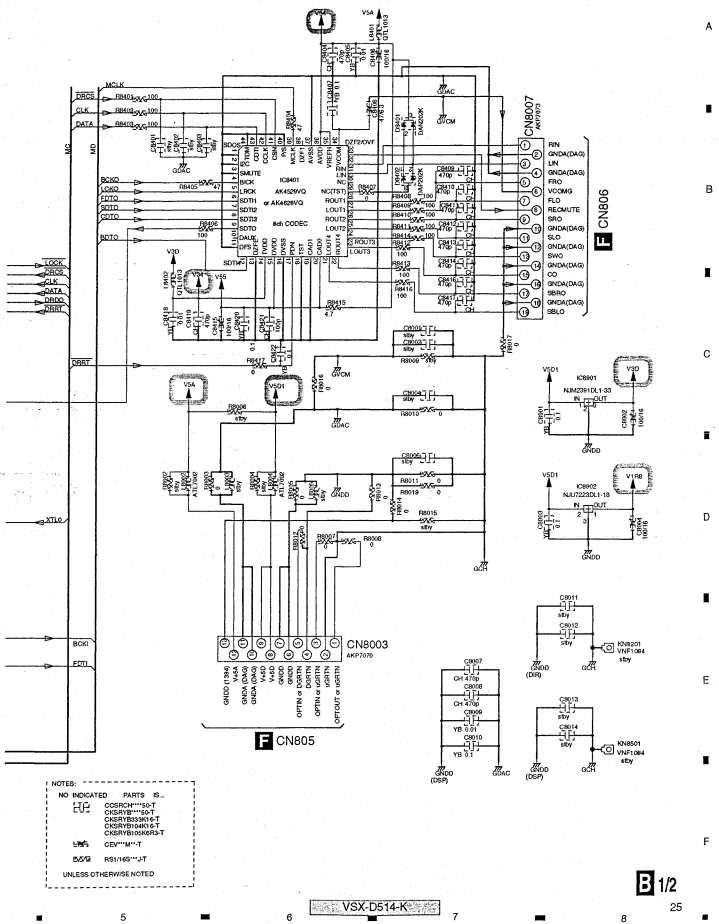
3.5 MAIN ASSY (3/3)



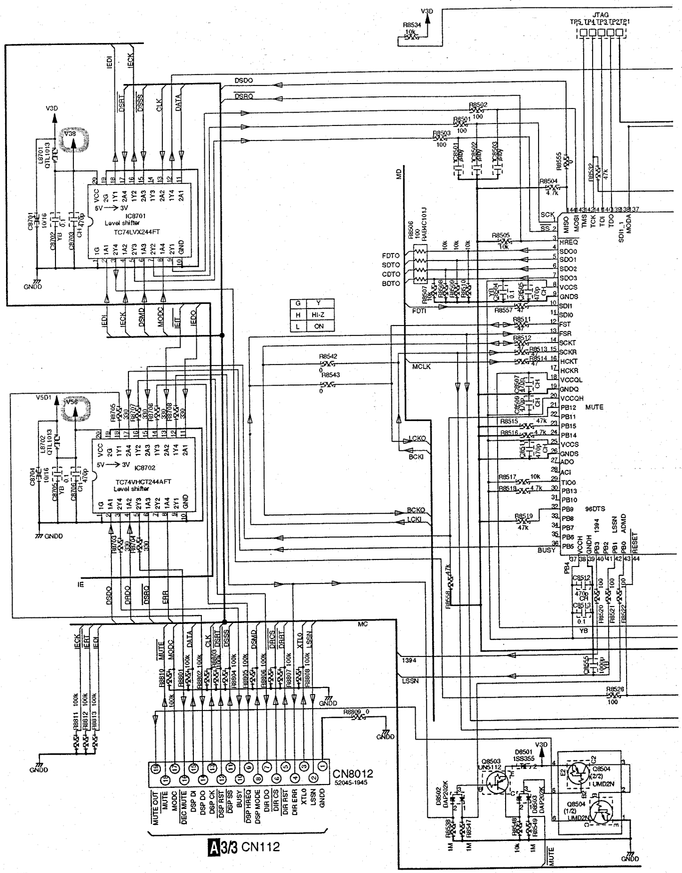


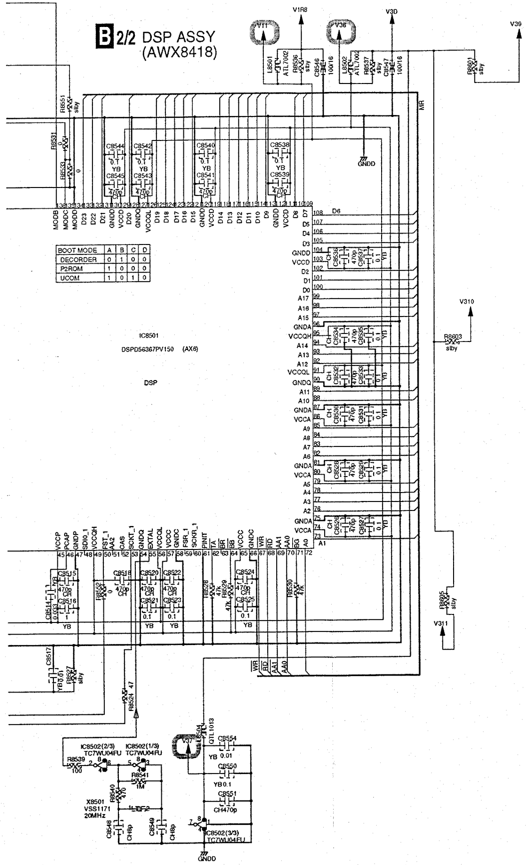
3.6 DSP ASSY (1/2)





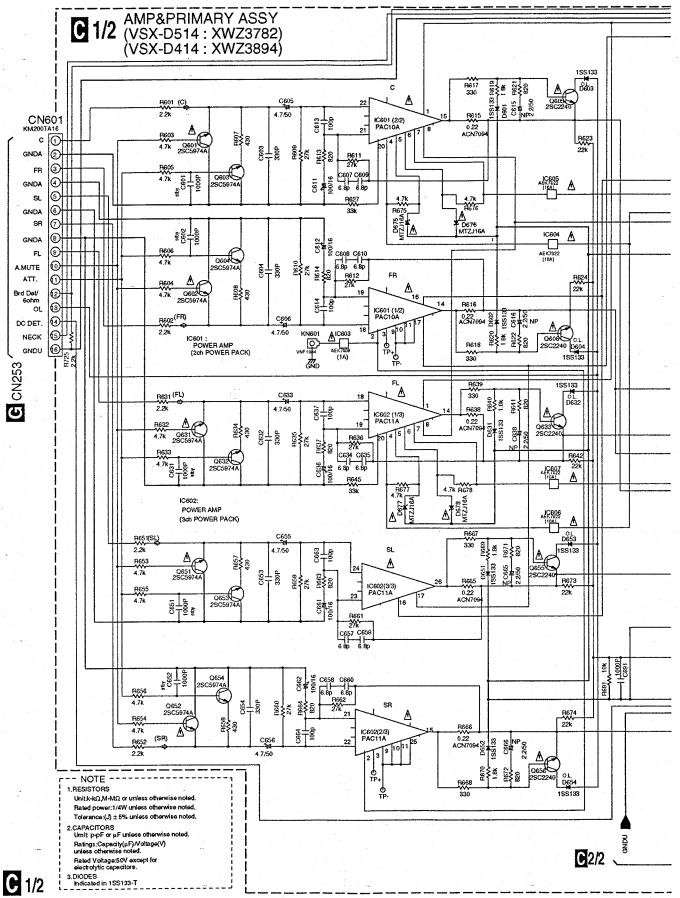
3.7 DSP ASSY (2/2)

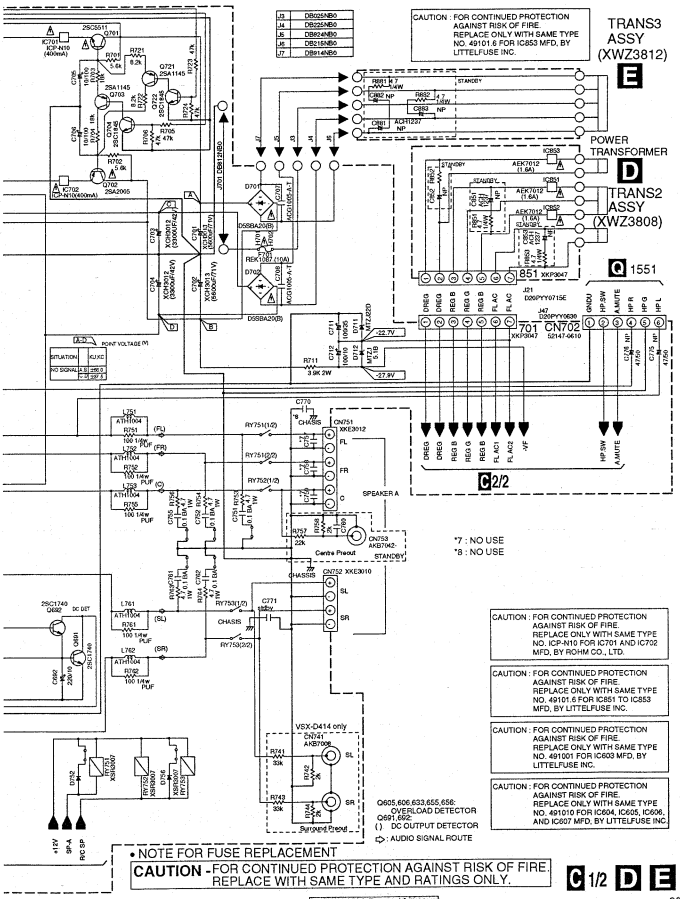




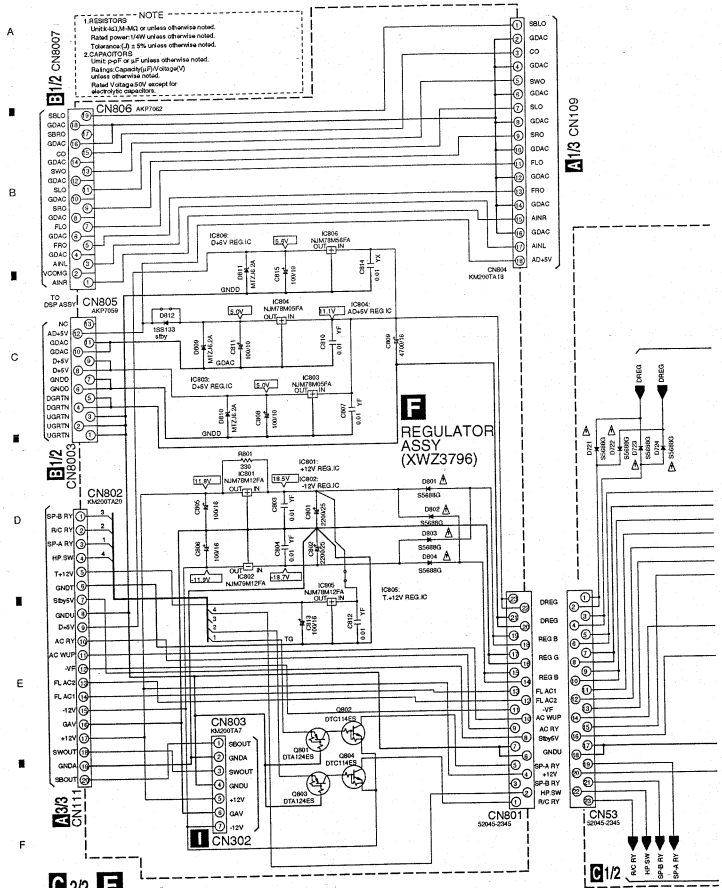
BOOT MODE	A	B	C	D
DECORDER	0	1	0	0
P2ROM	1	0	0	0
UCOM	1	0	1	0

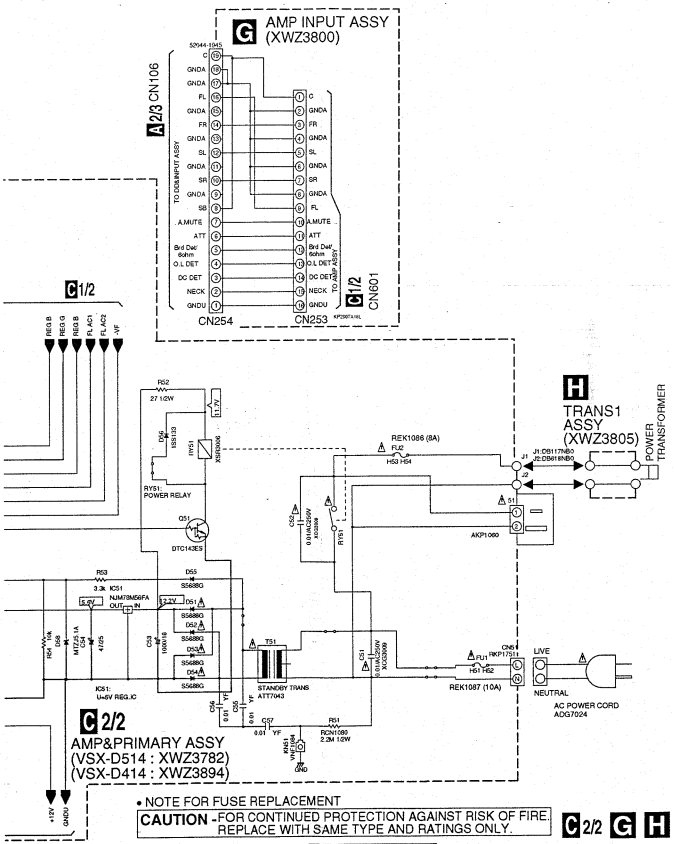
3.8 AMP & PRIMARY (1/2), TRANS2 and TRANS3 ASSYS



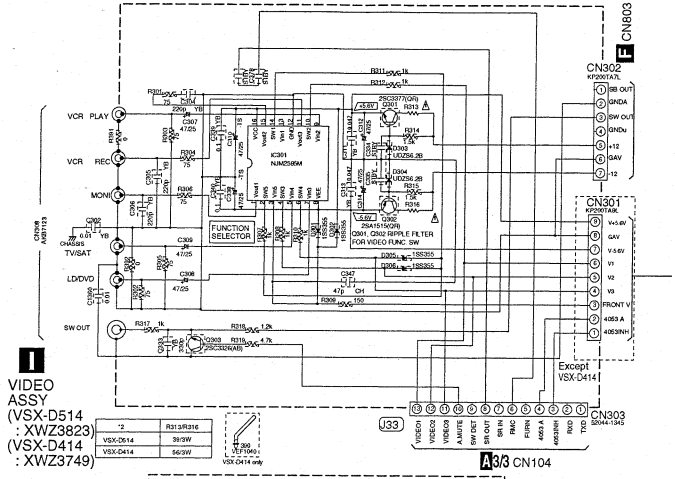

TRANS3 ASSY (XWZ3812)
E
POWER TRANSFORMER
D
TRANS2 ASSY (XWZ3808)
Q 1551
CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE NO. 49101.6 FOR IC853 MFD, BY LITTELFUSE INC.
SPEAKER A
Centre Preout
Surround Preout
VSX-D414 only
*7 : NO USE
*8 : NO USE
CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE ONLY WITH SAME TYPE NO. ICP-N10 FOR IC701 AND IC702 MFD, BY ROHM CO., LTD.
CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE ONLY WITH SAME TYPE NO. 49101.6 FOR IC851 TO IC853 MFD, BY LITTELFUSE INC.
CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE ONLY WITH SAME TYPE NO. 491001 FOR IC603 MFD, BY LITTELFUSE INC.
CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE ONLY WITH SAME TYPE NO. 491010 FOR IC604, IC605, IC606, AND IC607 MFD, BY LITTELFUSE INC.
Q605,606,633,655,656: OVERLOAD DETECTOR
Q691,692: DC OUTPUT DETECTOR
( ): AUDIO SIGNAL ROUTE
• NOTE FOR FUSE REPLACEMENT
CAUTION - FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE WITH SAME TYPE AND RATINGS ONLY.
C 1/2 D E
VSX-D514-K

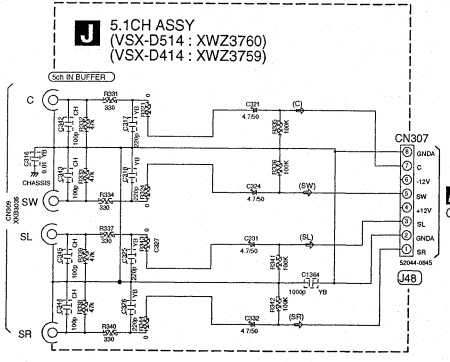
3.9 AMP & PRIMARY (2/2), REGULATOR, AMP INPUT and TRANS1 ASSYS

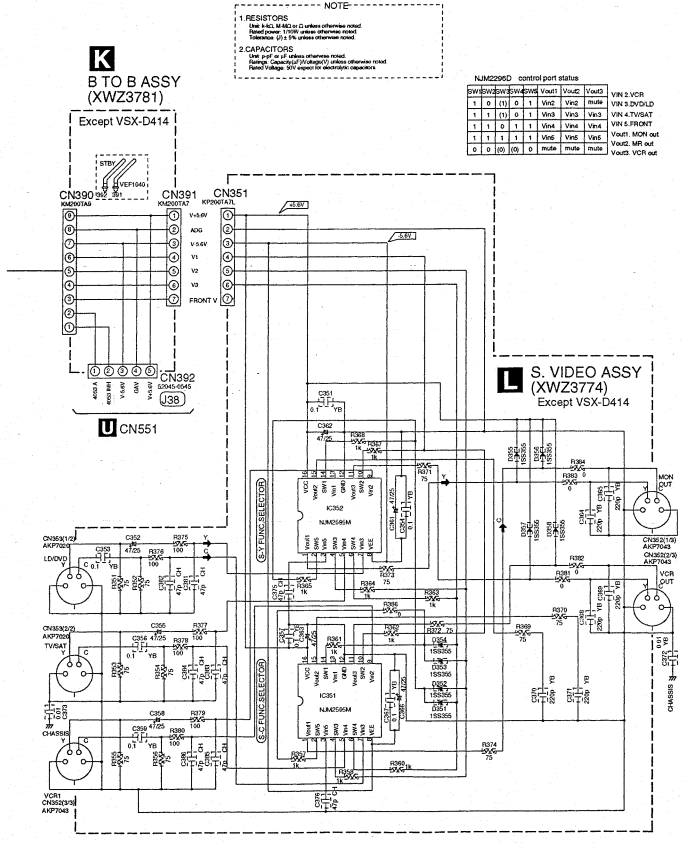




3.10 VIDEO, 5.1CH, B TO B and S. VIDEO ASSYS







NOTE

1.RESISTORS
Unit: k-Ω, M-Ω or Ω unless otherwise noted.
Rated power: 1/10W unless otherwise noted.
Tolerance: (J) ± 5% unless otherwise noted.

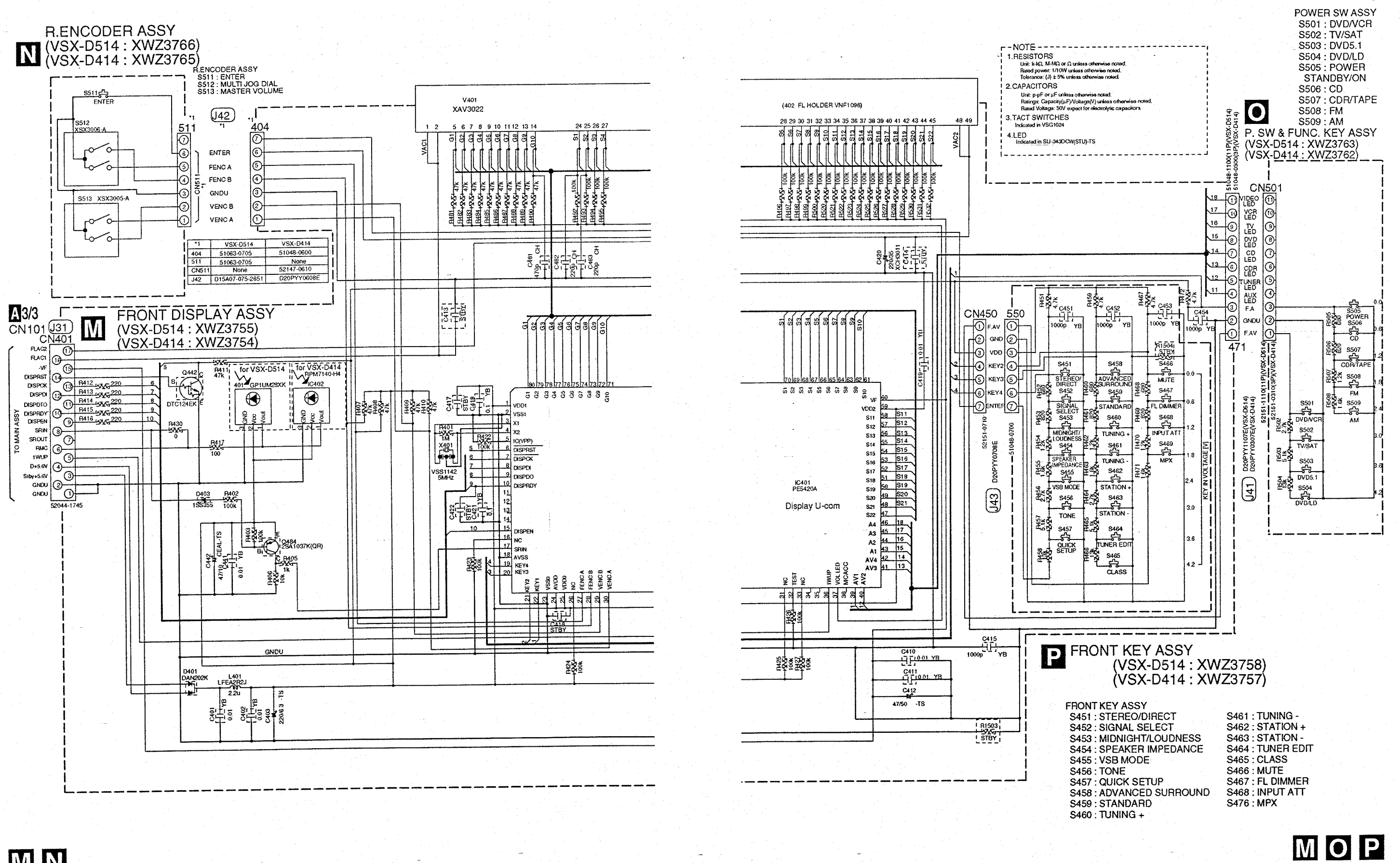
2.CAPACITORS
Unit: pcF or µF unless otherwise noted.
Ratings: Capacitor(µF)/Voltage(V) unless otherwise noted
Rated Voltage: 50V expect for electrolytic capacitors

NJM2296D control port status

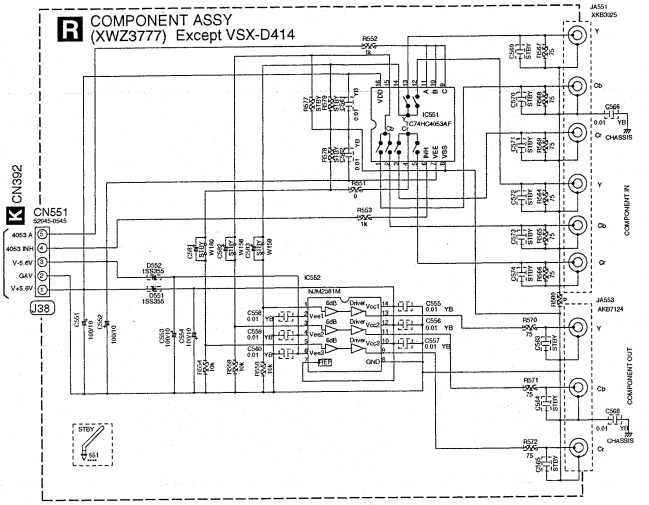
SW1	SW2	SW3	SW4	SW5	Vout1	Vout2	Vout3	
1	0	(1)	0	1	Vin2	Vin2	mute	VIN 2.VCR
1	1	(1)	0	1	Vin3	Vin3	Vin3	VIN 3.DVD/LD
1	1	0	1	1	Vin4	Vin4	Vin4	VIN 4.TV/SAT
1	1	1	1	1	Vin6	Vin5	Vin5	VIN 5.FRONT
0	0	(0)	(0)	0	mute	mute	mute	Vout1. MON out Vout2. MR out Vout3. VCR out

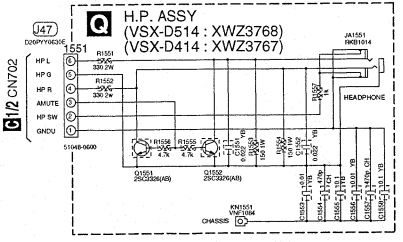
→ VIDEO SIGNAL FLOW
⇨ AUDIO SIGNAL FLOW

3.11 FRONT DISPLAY, R. ENCODER, P. SW&FUNC KEY and F. KEY ASSYS


N R.ENCODER ASSY
(VSX-D514 : XWZ3766)
(VSX-D414 : XWZ3765)
R.ENCODER ASSY
S511 : ENTER
S512 : MULTI JOG DIAL
S513 : MASTER VOLUME
*1 | VSX-D514 | VSX-D414
404 | 51063-0705 | 51048-0600
511 | 51063-0705 | None
CN511 | None | 52147-0610
J42 | D15A07-075-2651 | D20PYY0608E
A 3/3 CN101 J31 CN401
M FRONT DISPLAY ASSY
(VSX-D514 : XWZ3755)
(VSX-D414 : XWZ3754)
TO MAIN ASSY
V401 XAV3022
(402 FL HOLDER VNF1096)
IC401 PE5420A
Display U-com
NOTE
1.RESISTORS
Unit: k-kΩ, M-MΩ or Ω unless otherwise noted.
Rated power: 1/10W unless otherwise noted.
Tolerance: (J) ± 5% unless otherwise noted.
2.CAPACITORS
Unit: p-pF or μF unless otherwise noted.
Ratings: Capacity(μF)/Voltage(V) unless otherwise noted.
Rated Voltage: 50V expect for electrolytic capacitors.
3.TACT SWITCHES
Indicated in VSG1024
4.LED
Indicated in SLI-343DCW(STU)-TS
POWER SW ASSY
S501 : DVD/VCR
S502 : TV/SAT
S503 : DVD5.1
S504 : DVD/LD
S505 : POWER STANDBY/ON
S506 : CD
S507 : CDR/TAPE
S508 : FM
S509 : AM
O P. SW & FUNC. KEY ASSY
(VSX-D514 : XWZ3763)
(VSX-D414 : XWZ3762)
CN501
CN450 550
KEY IN VOLTAGE [V]
P FRONT KEY ASSY
(VSX-D514 : XWZ3758)
(VSX-D414 : XWZ3757)
FRONT KEY ASSY
S451 : STEREO/DIRECT
S452 : SIGNAL SELECT
S453 : MIDNIGHT/LOUDNESS
S454 : SPEAKER IMPEDANCE
S455 : VSB MODE
S456 : TONE
S457 : QUICK SETUP
S458 : ADVANCED SURROUND
S459 : STANDARD
S460 : TUNING +
S461 : TUNING -
S462 : STATION +
S463 : STATION -
S464 : TUNER EDIT
S465 : CLASS
S466 : MUTE
S467 : FL DIMMER
S468 : INPUT ATT
S476 : MPX

3.12 H.P. and COMPONENT ASSYS





NOTE

1. RESISTORS
   Unit: Ω kΩ, MΩ(Ω or Ω unless otherwise noted.
   Rated power: 1/10W unless otherwise noted.
   Tolerance: ±5 ± 5% unless otherwise noted.
2. CAPACITORS
   Unit: pμF or μF unless otherwise noted.
   Ratings: Capacitor(μF)/Voltage(V) unless otherwise noted.
   Rated Voltage: 50V except for electrolytic capacitors.

Q R

Q R

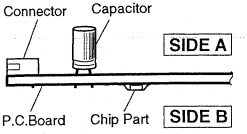
4. PCB CONNECTION DIAGRAM

NOTE FOR PCB DIAGRAMS :

1. Part numbers in PCB diagrams match those in the schematic diagrams.
2. A comparison between the main parts of PCB and schematic diagrams is shown below.

Symbol in PCB Diagrams	Symbol in Schematic Diagrams	Part Name
		Transistor
		Transistor with resistor
		Field effect transistor
		Resistor array
		3-terminal regulator

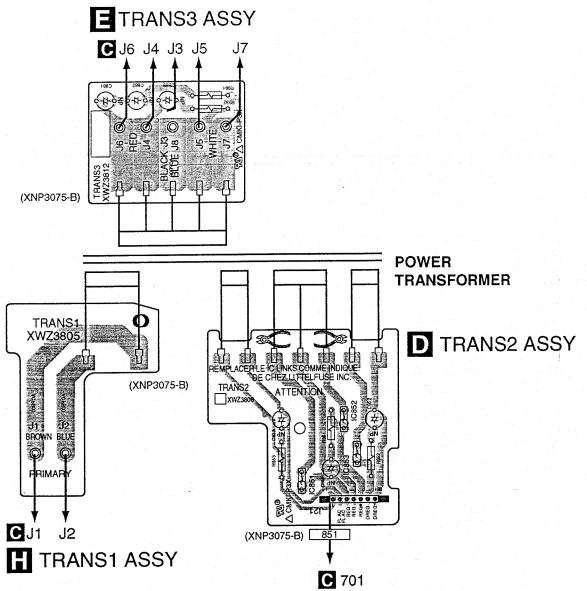
3. The parts mounted on this PCB include all necessary parts for several destinations.
   For further information for respective destinations, be sure to check with the schematic diagram.
4. View point of PCB diagrams.



4.1 TRANS2, TRANS3 and TRANS1 ASSYS

SIDE A

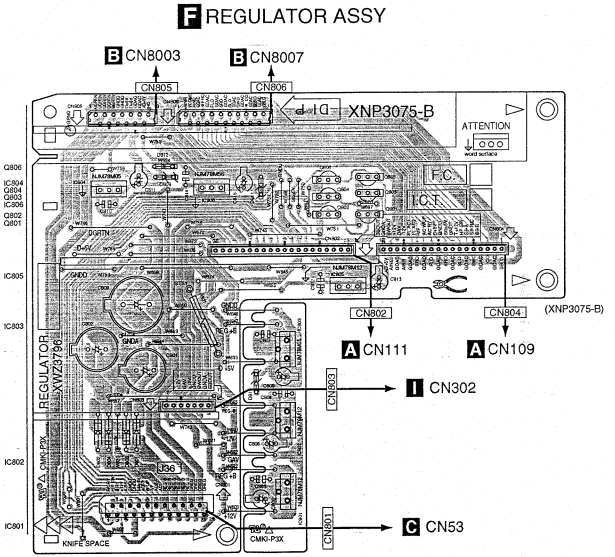
SIDE A



4.2 REGULATOR ASSY

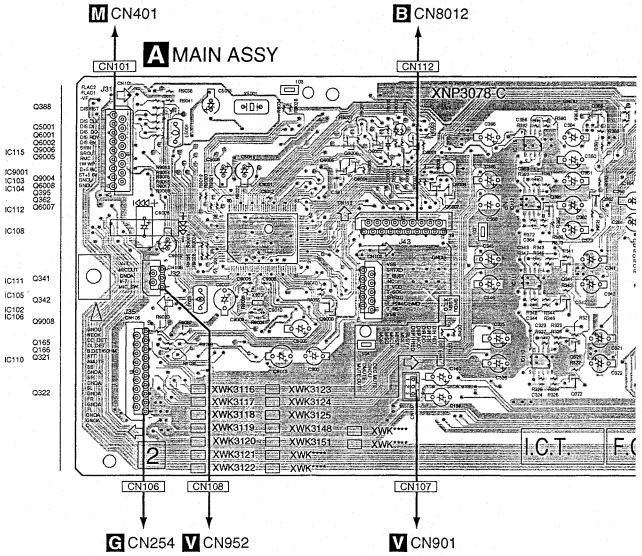
SIDE A

SIDE A

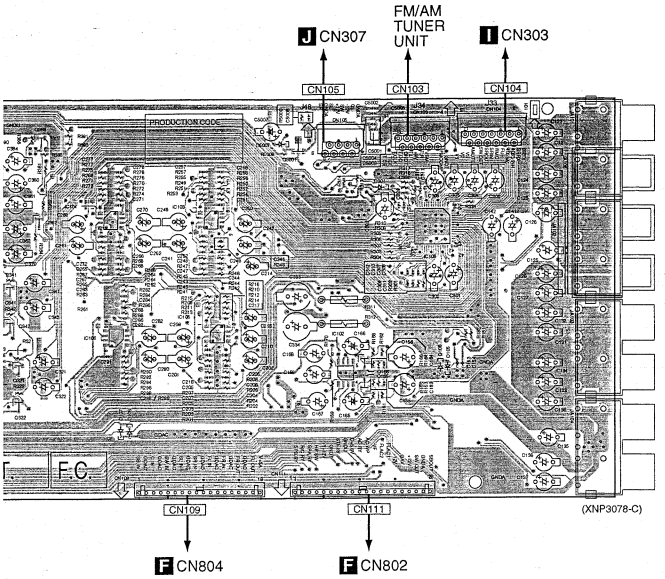


4.3 MAIN ASSY

SIDE A

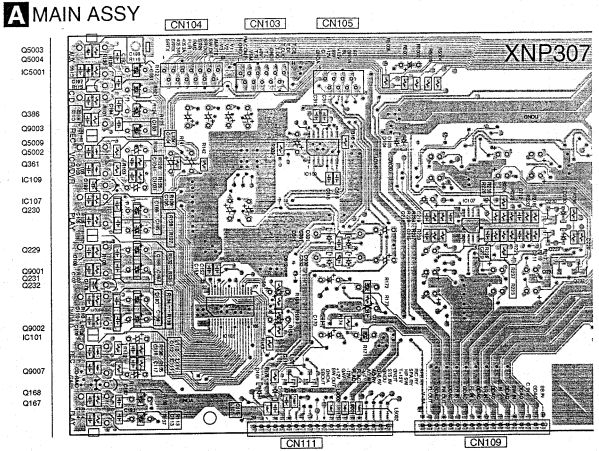


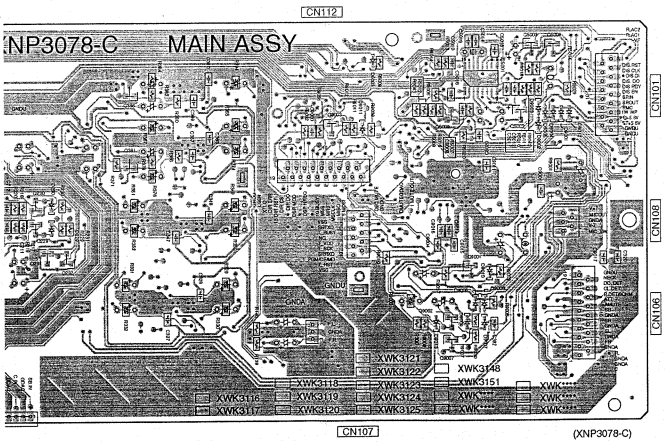
SIDE A



SIDE B

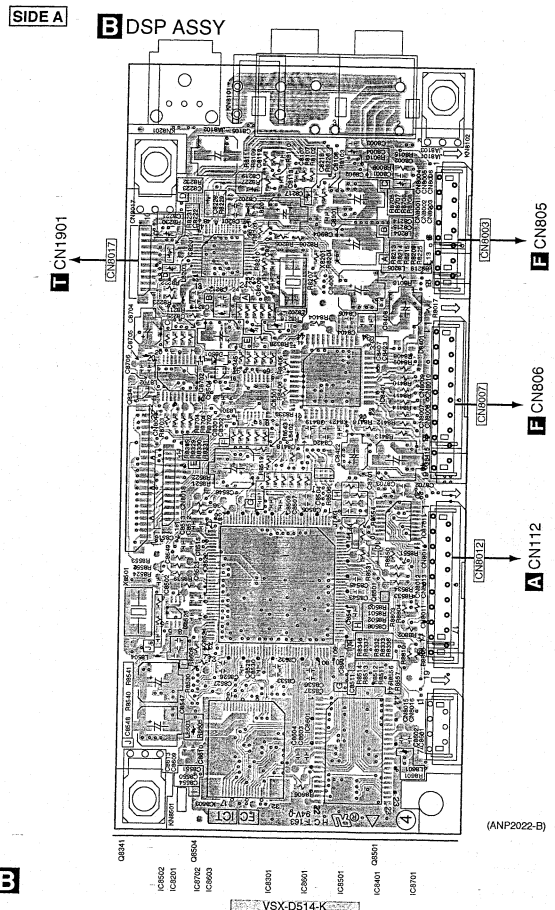
A MAIN ASSY

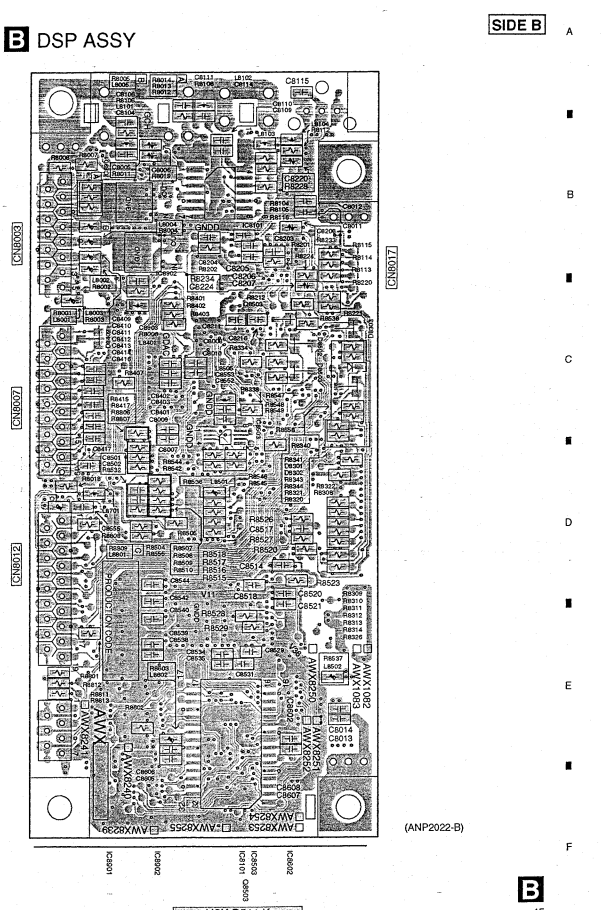




SIDE B

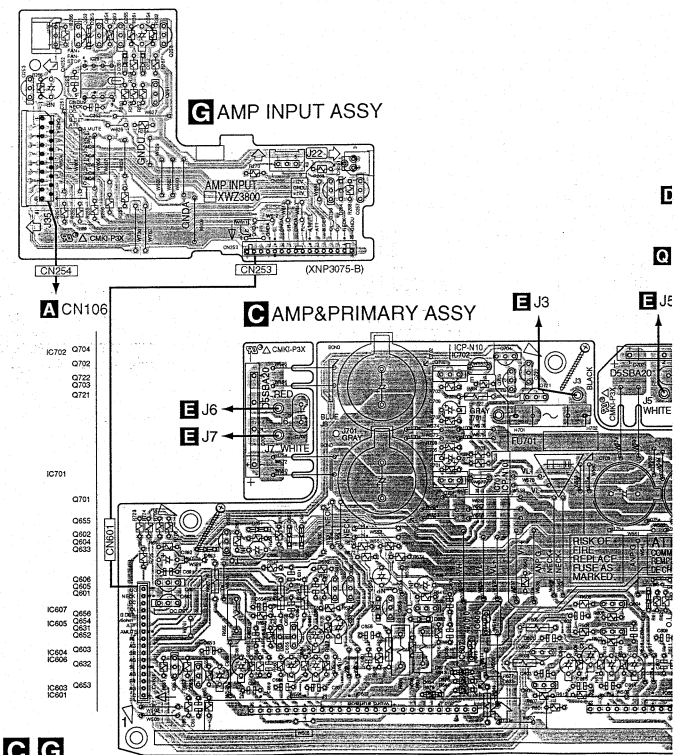
4.4 DSP ASSY

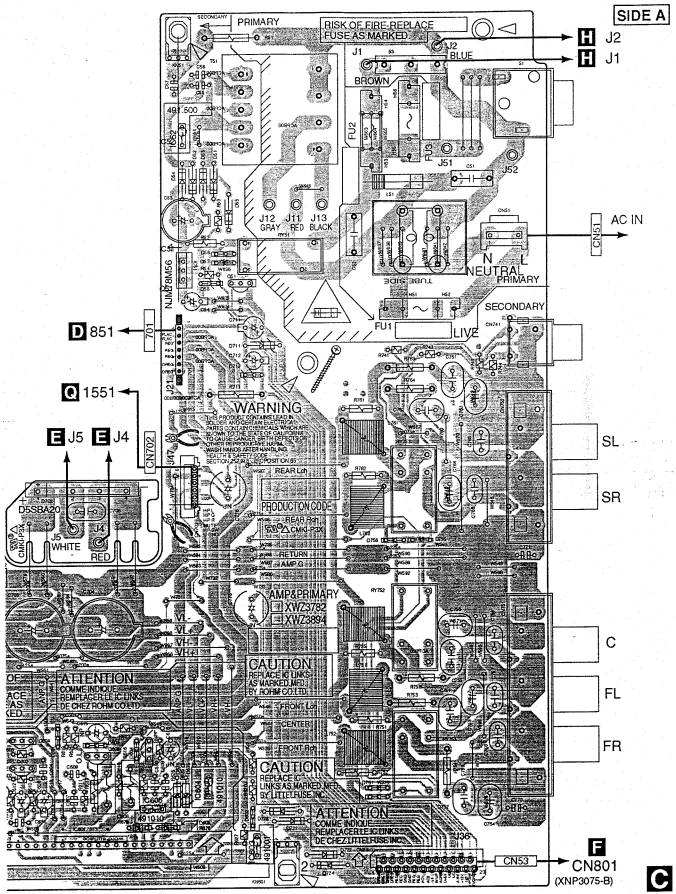

SIDE A
B DSP ASSY
SIDE A
T CN1901
CN9077
CN9003
F CN805
CN9027
F CN806
CN9112
A CN112
(ANP2022-B)
VSX-D514-K


SIDE B
B DSP ASSY
SIDE B
CN9003
CN9027
CN9112
CN9077
(ANP2022-B)
VSX-D514-K

4.5 AMP & PRIMARY and AMP INPUT ASSYS

SIDE A



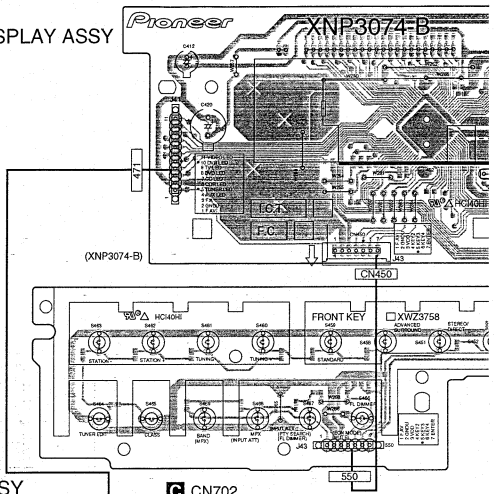


4.6 F. DISPLAY, R. ENCODER, P. SW & FUNC KEY, H. P. and F. KEY ASSYS

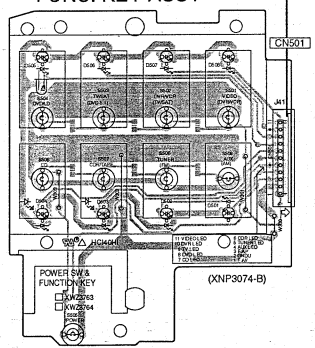
SIDE A

M FRONT DISPLAY ASSY

(for VSX-D514)

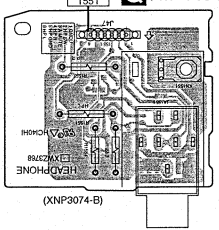


O P. SW & FUNC. KEY ASSY



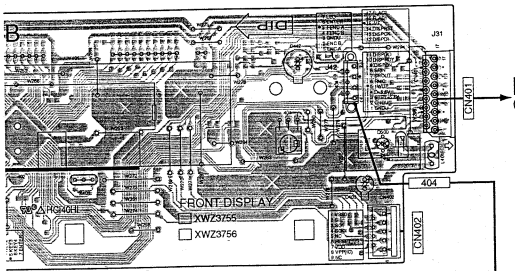
C CN702

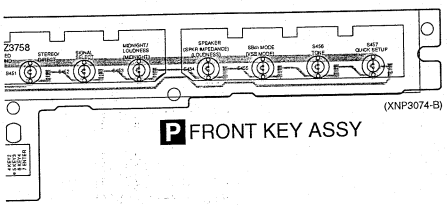
Q H.P ASSY



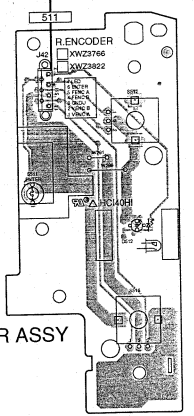
M O P Q

SIDE A





P FRONT KEY ASSY

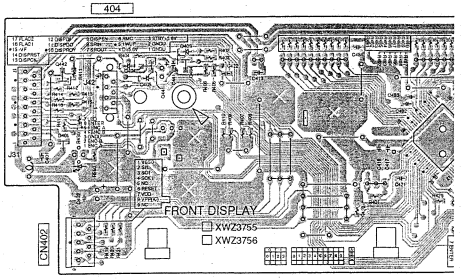


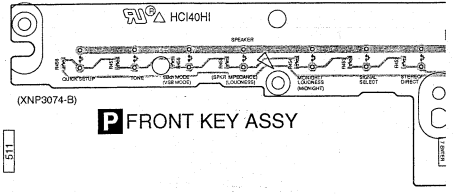
N R.ENCODER ASSY

M N P

SIDE B

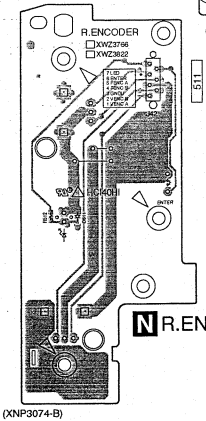
(for VSX-D514)





(XNP3074-B)

P FRONT KEY ASSY



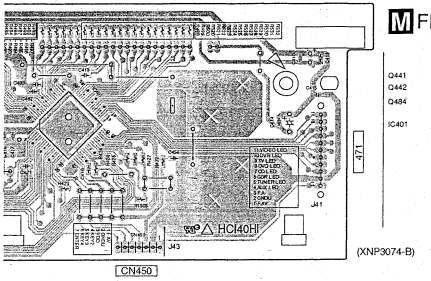
(XNP3074-B)

N R.ENCODER ASSY

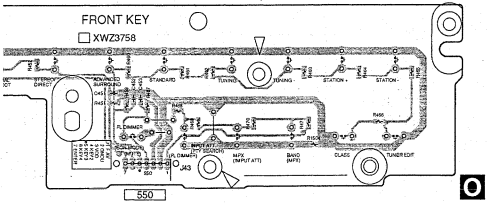
M **N** **P**

SIDE B

M FRONT DISPLAY ASSY

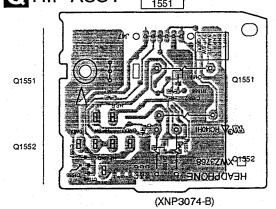


(XNP3074-B)

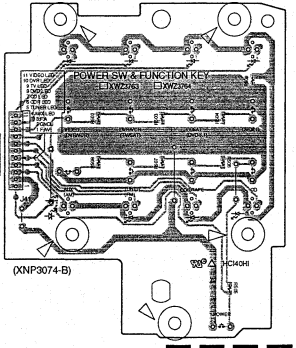


O P. SW & FUNC. KEY ASSY

Q H.P ASSY



(XNP3074-B)



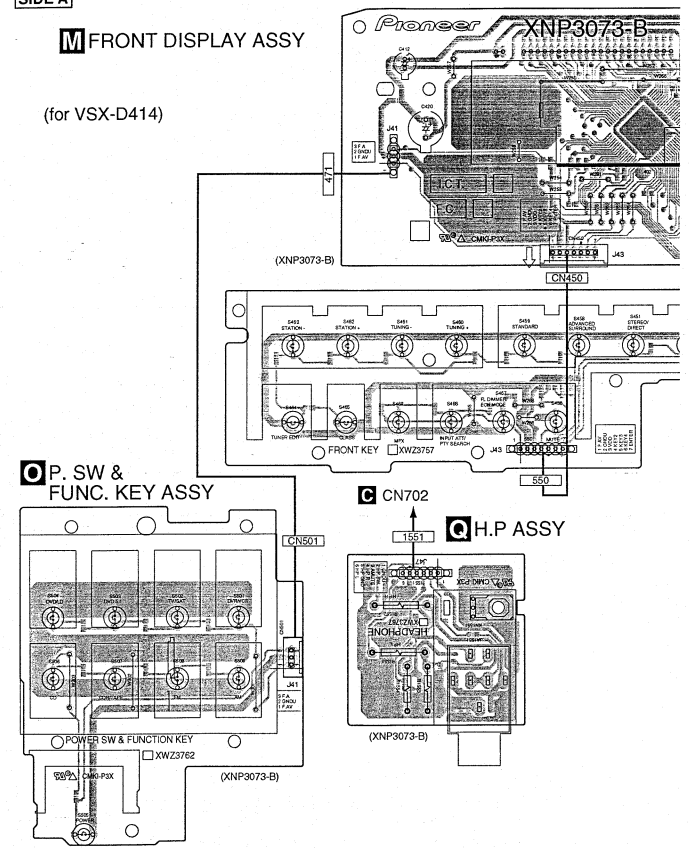
(XNP3074-B)

M **O** **P** **Q**

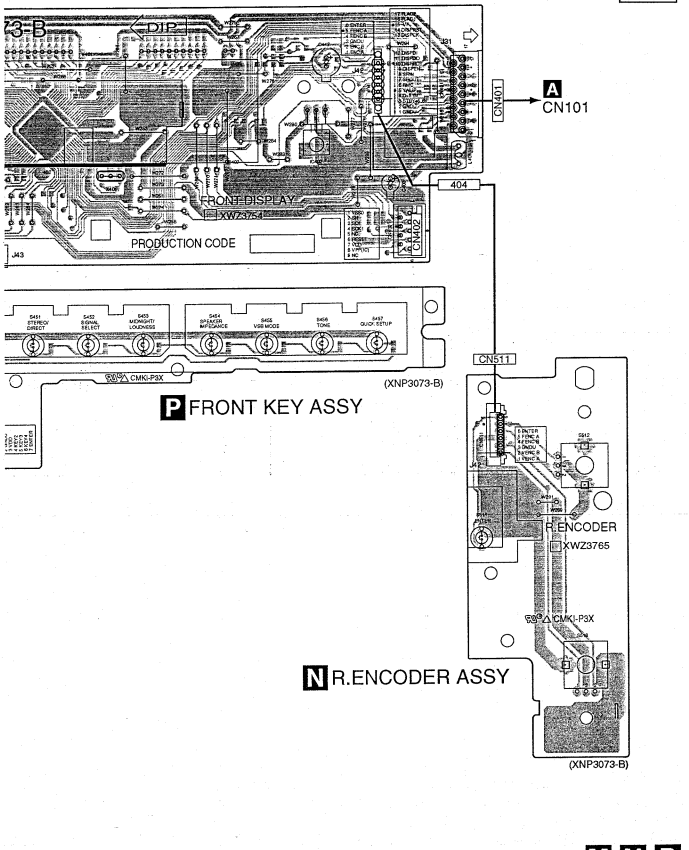
SIDE A

M FRONT DISPLAY ASSY

(for VSX-D414)

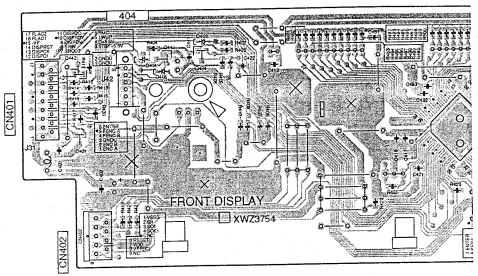


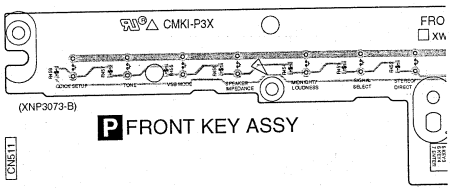
SIDE A



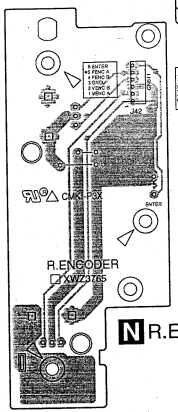
SIDE B

(for VSX-D414)





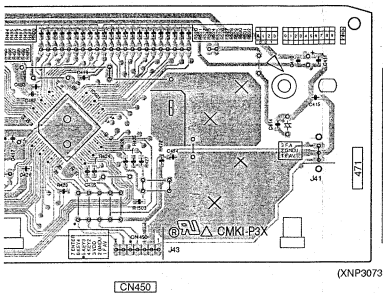
P FRONT KEY ASSY



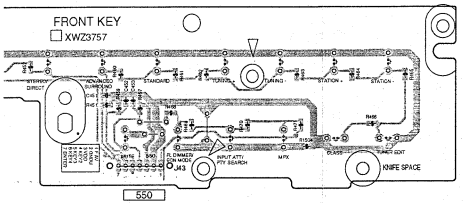
N R.ENCODER ASSY

M N P

SIDE B

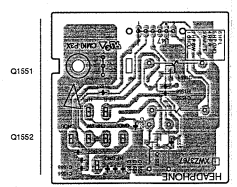


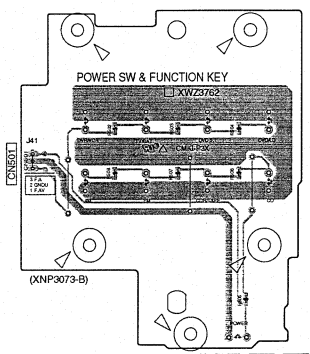
M FRONT DISPLAY ASSY



O P. SW & FUNC. KEY ASSY

Q H.P ASSY



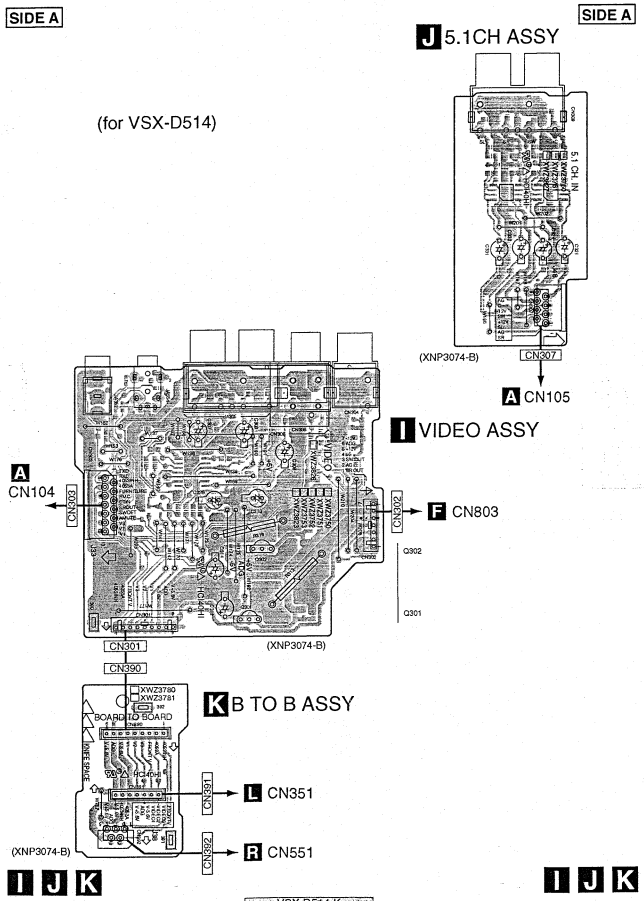


M O P Q

4.7 B TO B, VIDEO and 5.1CH ASSYS

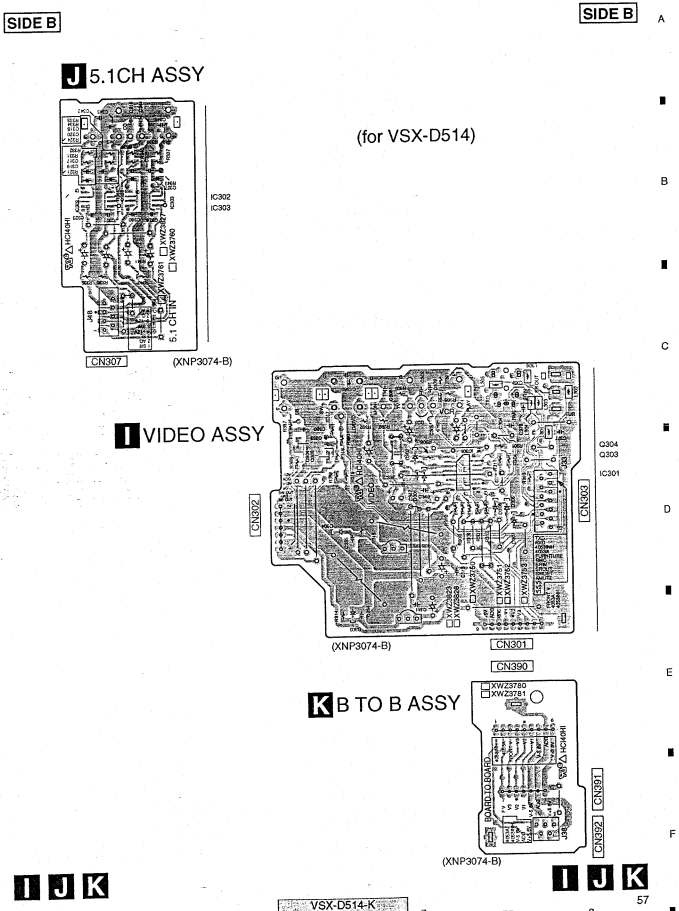
SIDE A

(for VSX-D514)



SIDE B

(for VSX-D514)

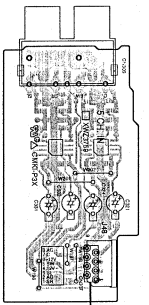


SIDE A

SIDE A

J 5.1CH ASSY

(for VSX-D414)



(XNP3073-B)

CN307

A CN105

I VIDEO ASSY

A CN104

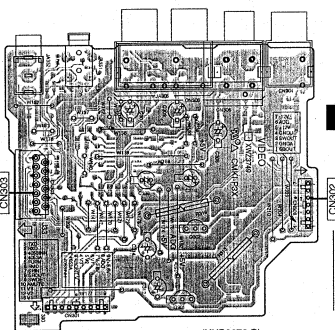
CN303

CN302

F CN803

Q302

Q301



(XNP3073-B)

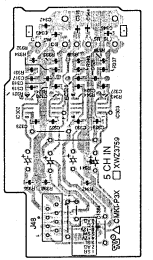
I J

I J

SIDE B

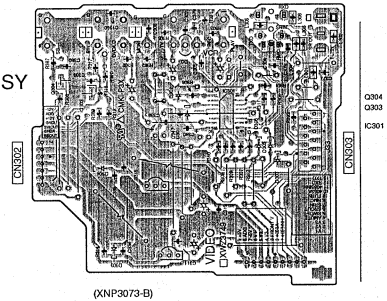
SIDE B

J 5.1CH ASSY



(for VSX-D414)

I VIDEO ASSY



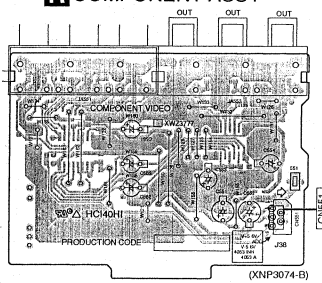
4.8 S.VIDEO and COMPONENT ASSYS

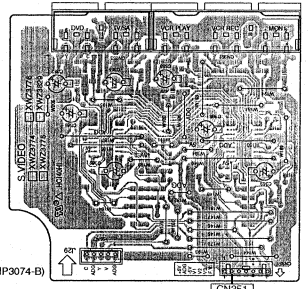
SIDE A

(Except VSX-D414)

R COMPONENT ASSY

SIDE A





L S. VIDEO ASSY

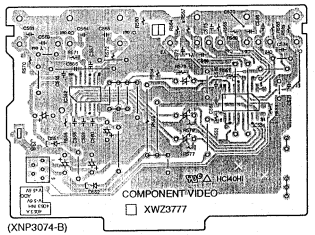
L R

L R

SIDE B

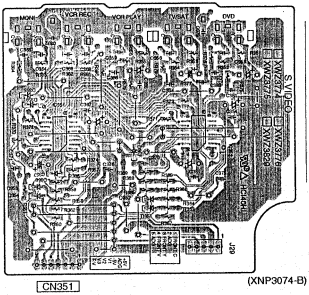
SIDE B

R COMPONENT ASSY



(Except VSX-D414)

L S. VIDEO ASSY



5. PCB PARTS LIST

NOTES: ● *Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.*
● *The △ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
● *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).
560 Ω → 56 x 10¹ → 561 ---------- RD1/4PU[5][6][1]J
47k Ω → 47 x 10³ → 473 ---------- RD1/4PU[4][7][3]J
0.5 Ω → R50 ---------- RN2H[R][5][0]K
1 Ω → 1R0 ---------- RS1PT[1][R][0]K
Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).
5.62k Ω → 562 x 10¹ → 5621 ---------- RN1/4PC[5][6][2][1]F

LIST OF WHOLE PCB ASSEMBLIES

Mark	Symbol and Description	VSX-D514-K/ KUCXJI	VSX-D514-S/ KUCXJI	VSX-D414-K/ KUCXJI	VSX-D414-S/ KUCXJI
	1..MAIN ASSY	XWK3116	XWK3116	XWK3148	XWK3148
	1..DSP ASSY	AWX8418	AWX8418	AWX8418	AWX8418
NSP	1..AMP & PS ASSY	XWK3192	XWK3192	XWK3152	XWK3152
	2..AMP & PRIMARY ASSY	XWZ3782	XWZ3782	XWZ3894	XWZ3894
	2..TRANS2 ASSY	XWZ3808	XWZ3808	XWZ3808	XWZ3808
	2..TRANS3 ASSY	XWZ3812	XWZ3812	XWZ3812	XWZ3812
	2..REGULATOR ASSY	XWZ3796	XWZ3796	XWZ3796	XWZ3796
	2..AMP INPUT ASSY	XWZ3800	XWZ3800	XWZ3800	XWZ3800
	2..TRANS1 ASSY	XWZ3805	XWZ3805	XWZ3805	XWZ3805
NSP	1..COMPLEX ASSY	XWK3147	XWK3147	XWK3126	XWK3126
	2..VIDEO ASSY	XWZ3823	XWZ3823	XWZ3749	XWZ3749
	2..I.CH ASSY	XWZ3760*	XWZ3760*	XWZ3759*	XWZ3759*
	2..B.TO B ASSY	XWZ3781	XWZ3781	Not used	Not used
	2..S.VIDEO ASSY	XWZ3774	XWZ3774	Not used	Not used
	2..FRONT DISPLAY ASSY	XWZ3755	XWZ3755	XWZ3754	XWZ3754
	2..R.ENCODER ASSY	XWZ3766	XWZ3766	XWZ3765	XWZ3765
	2..P.SW & FUNC.KEY ASSY	XWZ3763	XWZ3763	XWZ3762	XWZ3762
	2..FRONT KEY ASSY	XWZ3758*	XWZ3758*	XWZ3757*	XWZ3757*
	2..H.P. ASSY	XWZ3768*	XWZ3768*	XWZ3767*	XWZ3767*
	2..COMPONENT ASSY	XWZ3777	XWZ3777	Not used	Not used
	1..FM/AM TUNER UNIT	AXX7172	AXX7172	AXX7172	AXX7172

*: Costructed same.

COMPLEX ASSY

XWK3147 and XWK3126 are constructed the same except for the following :

Mark	Symbol and Description	XWK3147	XWK3126
	J41 Jumper Wire 11P	D20PYY1107	Not used
	J41 Jumper Wire 3P	Not used	D20PYY0307E
	J42 Jumper Wire 7P	D15A07-075-2651	Not used
	J42 Jumper Wire 6P	Not used	D20PYY0606E

A MAIN ASSY

XWK3116 and XWK3148 are constructed the same except for the following :

Mark	Symbol and Description	XWK3116	XWK3148
	C9006	DTC143EK	Not used
	R9024	Not used	RS1/16S472J
	R9026	RS1/16S0R0J	RS1/16S22J
	R9061	RS1/16S473J	Not used

C AMP & PRIMARY ASSY

XWZ3782 and XWZ3894 are constructed the same except for the following :

Mark	Symbol and Description	XWZ3782	XWZ3894
	R741, R743	Not used	RD1/4PU333J
	R742, R744	Not used	RD1/4PU202J
	CN741	Not used	AKB7008

I VIDEO ASSY

XWZ3823 and XWZ3749 are constructed the same except for the following :

Mark	Symbol and Description	XWZ3823	XWZ3749
	R313, R316	RS3LMF390J	RS3LMF560J
	CN301	KP300TA04	Not used
	390 PCB Binder	Not used	VEF1040

M FRONT DISPLAY ASSY

XWZ3755 and XWK3754 are constructed the same except for the following :

Mark	Symbol and Description	XWZ3755	XWZ3754
	401	GP1UM280X	Not used
	IC402	Not used	RPM7140-H4
	3P Cable Holder	Not used	51048-0300
	6P Cable Holder	Not used	51048-0600
	7P Cable Holder	51063-0705	Not used
	11P Cable Holder	51048-1100	Not used

N R.ENCODER ASSY

XWZ3766 and XWZ3765 are constructed the same except for the following :

Mark	Symbol and Description	XWZ3766	XWZ3765
	6P Cable Holder	Not used	52147-0610
	7P Cable Holder	51063-0705	Not used

O P.SW & FUNC. KEY ASSY

XWZ3763 and XWZ3762 are constructed the same except for the following :

Mark	Symbol and Description	XWZ3763	XWZ3762
NSP	CN501	52151-1110	Not used
	CN501	Not used	52151-0310

Mark No.	Description	Part No.
AMP & PS ASSY		
OTHERS		
J21	Jumper Wire	D20PYY0715E
J6	Lead wire Unit	DB21SN80
COMPLEX ASSY		
OTHERS		
J42	Jumper Wire	D15A07-075-2651
J47	Jumper Wire	D20PYY0630E
J43	Jumper Wire 7P	D20PYY0706E
J41	Jumper Wire 11P	D20PYY1107E
A MAIN ASSY		
SEMICONDUCTORS		
IC108		BD3813KS
IC101		BD3841FS
IC103-IC105, IC107		HA17558AF

Mark No.	Description	Part No.
	IC102	NJM2100M
	IC9001	PD5963A
	IC110-IC112	UPC4570G2
	Q165, Q166, Q321, Q322	2SC3326
	Q341, Q342, Q361, Q362, Q365	2SC3326
	Q5001	2SD1664
	Q229, Q230	2SK269
	Q167, Q231, Q9002-Q9005	DTA124EK
	Q9008	DTA143TK
	Q232	DTC124EK
	Q168, Q9001, Q9006	DTC143EK
	Q9007	DTC143TK
	D103-D108, D229, D230, D301	1SS355
	D311, D312, D9001-D9013	1SS355
	D101, D102	RB501V-40
	D5007	UDZS10B
	D231, D332	UDZS6.8B
COILS AND FILTERS		
	L9001, L9002 Chip Solid Inductor	ATL7002

Mark No.	Description	Part No.
	L9003	LFEA2R2J
	L101-L104, L111, L112, L5002	QTL1013
	Chip Solid Inductor	

CAPACITORS

	C9003 (0.22PS.6V)	ACH7144
	C151, C152, C243, C244, C263	CCSRCH101J50
	C317, C318, C324, C324	CCSRCH101J50
	C343, C344, C363	CCSRCH101J50
	C1031, C1041, C117, C118	CCSRCH220J50
	C205-C206, C245-C246, C265	CCSRCH031J50
	C267	CCSRCH031J50
	C203, C204	CCSRCH471J50
	C366	CEANP497M5J
	C123-C128, C131-C138	CEAT100M50
	C141, C142, C167, C168	CEAT100M50
	C209, C210, C213, C214	CEAT100M50
	C249, C259, C269, C270	CEAT100M50
	C301-C306, C321, C322	CEAT100M50
	C341, C342, C361, C362	CEAT100M50
	C5007	CEAT101M16
	C159	CEAT221M6R3
	C201, C202, C241, C242	CEAT222M50
	C261, C262, C9005	CEAT228M50
	C9007	CEAT331M6R3
	C325, C326, C345, C346, C365	CEAT470M25
	C155, C156	CEAT470M50
	C333, C334	CEAT471M10
	C9013	CEAT471M6R3
	C165, C166, C370	CEAT477M50
	C170	CKSQYB104K16
	C320, C392, C5001, C9015, C9016	CKSRYB102K50
	C115, C116, C153, C154, C171	CKSRYB103K50
	C179, C180, C199, C215-C218	CKSRYB103K50
	C251, C252, C266, C271, C272	CKSRYB103K50
	C319, C327-C330, C347, C348	CKSRYB103K50
	C367, C368, C5002, C9004, C9008	CKSRYB103K50
	C9017	CKSRYB103K50
	C219, C220, C309-C312	CKSRYB104K16
	C5003, C9006	CKSRYB105K10
	C264	CKSRYB223K25
	C257, C258, C277, C278	CKSRYB472K50
	C207, C308, C364	CKSRYB472K50
	C9011, C9014	CKSRYB473K16
	C268	CKSRYB562K50
	C381	CKSRYF104Z16

RESISTORS

⚠	R171, R172	RS1/16S470J
⚠	R173, R174	RS1/16S472J
⚠	R311, R312	RS1LMF101J
	Other Resistors	RS1/16S###J

OTHERS

	X9001 (15.7MHz)	XSS3004
	CN105 8P Connector	52044-0845
	CN103 11P Connector	52044-1145
	CN104 13P Connector	52044-1345
	CN101 17P Connector	52045-1745
	CN106, CN112 19P Connector	52045-1945
	CN109 18P Socket	KP200TA18L
	CN111 20P Socket	KP200TA20L
	JA103, JA104 PCB Binder	XKD3017

Mark No.	Description	Part No.
	JA106 6P Pin Jack	XKB3037

B DSP ASSY

SEMICONDUCTORS

	IC8201	AK4114VQ
	IC8401	AK4629VQ
	IC8501	DSPDS6367PV150
	IC8601	NJM2903DL1-33
	IC8902	NJU7223DL1-18
	IC8101	TC74HCU04AF
	IC8701	TC74LVX244FT
	IC8702	TC74VHCT244AFT
	IC8502	TC7WU04FU
	Q8504	UMD2N
	Q8503	UN5112
	Q8501	1SS355
	D8401	DAN235K
	D8402, D8502, D8503	DAP202K

COILS AND FILTERS

	L8002, L8004, L8501, L8502	ATL7002
	Chip Solid Inductor	
	L8101-L8104, L8201, L8203, L8204	QTL1013
	L5401, L8402, L8504, L8701, L8702	QTL1013
	Chip Solid Inductor	

CAPACITORS

	C8208, C8210	CCSRCH100D50
	C8421	CCSRCH101J50
	C8107, C8112	CCSRCH470J50
	C8007, C8008, C8109, C8201, C8212	CCSRCH471J50
	C8214, C8404, C8409-C8414	CCSRCH471J50
	C8416, C8417, C8419, C8505, C8507	CCSRCH471J50
	C8509, C8511, C8512, C8515, C8518	CCSRCH471J50
	C8520, C8522, C8524, C8526, C8528	CCSRCH471J50
	C8530, C8532, C8534, C8536, C8539	CCSRCH471J50
	C8541, C8543, C8545, C8551, C8703	CCSRCH471J50
	C8708	CCSRCH471J50
	C8548, C8549	CCSRCH8R0D50
	C8701, C8704	CEVW100M16
	C8105, C8408, C8415, C8548, C8547	CEVW101M16
	C8902, C8904	CEVW101M16
	C8217, C8225, C8408	CEVW476M6R3
	C8204, C8555	CKSRYB102K50
	C8009, C8104, C8114, C8405, C8418	CKSRYB103K50
	C8517, C8554	CKSRYB103K50
	C8010, C8115, C8202, C8207, C8213	CKSRYB104K16
	C8215, C8407, C8420, C8422, C8504	CKSRYB104K16
	C8513, C8521, C8523, C8525, C8527	CKSRYB104K16
	C8529, C8531, C8533, C8535	CKSRYB104K16
	C8537, C8538, C8540, C8542, C8544	CKSRYB104K16
	C8550, C8702, C8705, C8901, C8903	CKSRYB104K16
	C8110, C8516	CKSRYB105K6R2
	C8514	CKSRYB223K16
	C8203	CKSRYB473K50

RESISTORS

	R8506	RAB4C101J
	R8201	RS1/16S1802F
	Other Resistors	RS1/16S###J

OTHERS

Mark No.	Description	Part No.
	X8501 (20MHz)	VSS1171
	X8301 (24.576MHz)	XSS3003
	CN8012 19P Connector	52045-1945
	JA8101 2P Pin Jack	AK37131
	CN8003 13P Socket	AKP7070
	CN8007 19P Socket	AKP7073
	JA8102 OPT. Link In	GP1FA513RZB
	CN8017 10P Connector	VKN4144

C AMP & PRIMARY ASSY

SEMICONDUCTORS

⚠	IC803	AEK7009
⚠	IC804-IC807	AEK7022
⚠	IC701, IC702	ICP-N10
	IC51	NJM78M05FA
⚠	IC901	PAC010A
⚠	IC502	PAC011A
	Q703, Q721	2SA1145
	Q702	2SA2065
	Q691, Q692	2SC1740S
	Q704, Q722	2SC1845
	Q905, Q906, Q633, Q655, Q656	2SC2240
	Q701	2SC5011
	Q601-Q604, Q631, Q632	2SC5974A
	Q651-Q654	2SC5974A
	Q51	DTC143EB
	D58, D601-D604, D631, D632	1SS133
	D651-D654, D752, D758	1SS133
⚠	D701, D702	DSSBA20(R)
	D675-D678	MTZJ18A
	D711	MTZJ22D
	D59, D712	MTZJ5.1B
⚠	D51-D55, D721-D724	S5688G

COILS AND FILTERS

	L751-L753, L761, L762 Coil	ATH1004

SWITCHES AND RELAYS

	RY51	XSR3006
	RY751-RY753	XSR2007

CAPACITORS

	C707, C708 (0.01/AC250V)	ACG1005
	C607-C610, C634, C635	CCPUCH6R8K50
	C657-C660	CCPUCH6R8K50
	C615, C616, C638, C665, C666	CEANP2R2M50
	C775, C776	CEANP470M50
	C712	CEAT101M10
	C611, C612, C636, C661, C662	CEAT101M16
	C711	CEAT101M35
	C53	CEAT102M16
	C692	CEAT228M10
	C54	CEAT470M25
	C605, C606, C633, C655, C656	CEAT477M50
	C705, C706	CEHAT100M2A
	C613, C614, C637, C663, C664	CKPUYB101K50
	C691	CKPUYB102K50
	C603, C604, C632, C653, C654	CKPUYB331K50
	C55-C57	CKPUYF103Z25
	C751, C752, C755, C761, C762	COMBA10A350
	C51, C52 (10000pF/AC250V)	XCG3009

Mark No.	Description	Part No.
	C703, C704 (2200/42V)	XCH3012
	C701, C702 (5600/71V)	XCH3013

RESISTORS

⚠	R615, R616, R638, R665	ACN7094
⚠	R666 (0.22.5W)	ACN7094
⚠	R51 (2.2kΩ/2W)	RCN1060
⚠	R52	RD1/2PM270J
⚠	R751, R752, R755, R761, R762	RD1/4PUF10JJ
⚠	R753, R754, R756, R763, R764	RS1LMF47RJ
⚠	R711	RS2LMF392J
	Other Resistors	RD1/4PU###J

OTHERS

	CN52 23P Connector	52045-2345
	CN702 6P Jumper Connector	52147-0610
	51 AC Socket 1-P	AKP1060
	H51-H54, H701, H702 Fuse Clip	AKR7001
⚠	T51 Standby Transformer	ATT7043
	CN601 16P Plug	KM200TA16
	CN51 AC Cord Socket	RKP1751
	KN51, KN601 Earth Metal Fitting	VNF1084
	CN752 4P Speaker Terminal	XKE3010
	CN751 6P Speaker terminal	XKE3012
	701 7P Cable Holder	XKP3047

D TRANS2 ASSY

SEMICONDUCTORS

⚠	IC851-IC853	AEK7012

OTHERS

	851 7P Cable Holder	XKP3047

E TRANS3 ASSY

TRANS3 ASSY has no service part.

F REGULATOR ASSY

SEMICONDUCTORS

	IC803, IC804	NJM78M05FA
	IC801, IC805	NJM79M12FA
	IC806	NJM78M05FA
	IC802	NJM79M12FA
	Q801, Q803	DTA124ES
	Q802, Q804	DTC114ES
	D809-D811	MTZJ6.2B
⚠	D801-D804	S5688G

CAPACITORS

	C811, C815	CEAT101M10
	C813	CEAT101M16
	C801, C802	CEAT222M25
	C809	CEAT472M16
	C808	CEHAT101M10
	C805, C806	CEHAT101M16
	C803, C804, C807, C810, C812	CKPUYF103Z25
	C814	CKPUYF103Z25

RESISTORS

Mark No.	Description	Part No.
	RB01	RS3LMF391J

OTHERS

	CN801 23P Connector	52045-2345
	CN805 13P Plug	AKP7059
	CN806 16P Plug	AKP7062
	CN804 18P Plug	KM200TA18
	CN802 20P Plug	KM200TA20
	CN803 7P Plug	KM200TA7

G AMP INPUT ASSY

OTHERS

	CN254 16P Connector	52044-1645
	CN253 16P Socket	KP200TA16L

H TRANS1 ASSY

TRANS1 ASSY has no service part.

I VIDEO ASSY

SEMICONDUCTORS

	IC301	NJM2595M
	Q302	2SA1515
	Q303	2SC2026
	Q301	2SC3377
	D301, D302, D305, D306	1SS355
	D303, D304	UDZS6.2B

CAPACITORS

	C347	CCSRCH470J50
	C307-C310, C312, C314, C338	CEAT476M25
	C1360, C302	CKSRYB103K50
	C339, C340	CKSRYB104K25
	C304-C306	CKSRYB221K50
	C333	CKSRYB331K50
	C311, C313	CKSRYB473K25

RESISTORS

	⚠ R313, R316	RS3LMF300J
	Other Resistors	RS1/16S###J

OTHERS

	CN303 13P Connector	52044-1345
	CN308 6P Pin Jack	AKB7123
	CN302 7P Socket	KP200TA7L
	CN301 9P Socket	KP200TA9L

J 5.1CH ASSY

CAPACITORS

	C342-C345	CCSRCH101J50
	C321, C324, C331, C332	CEAT476M50
	C1564	CKSRYB102K50
	C316	CKSRYB103K50
	C317, C318, C325, C326	CKSRYB221K50

RESISTORS

	Other Resistors	RS1/16S###J

OTHERS

	CN307 8P Connector	52044-0845

Mark No.	Description	Part No.
	CN309 4P Pin Jack	XKB3035

K B TO B ASSY

OTHERS

	CN392 5P Connector	52045-0545
	CN391 7P Plug	KM200TA7
	CN390 9P Plug	KM200TA9
	391 PCB Binder	VEF1040

L S.VIDEO ASSY

SEMICONDUCTORS

	IC351, C352	NJM2595M
	D351-D358	1SS355

CAPACITORS

	C375, C376, C381-C386	CCSRCH470J50
	C352, C356, C358, C361-C363	CEAT476M25
	C366	CEAT476M25
	C372, C373	CKSRYB103K50
	C351, C353, C354, C356, C357	CKSRYB104K25
	C359, C367	CKSRYB104K25
	C364, C365, C368-C371	CKSRYB221K50

RESISTORS

	Other Resistors	RS1/16S###J

OTHERS

	CN353 2-4P Mini DIN Socket	AKP7020
	CN352 3-4P Mini DIN Socket	AKP7043
	CN351 7P Socket	KP200TA7L

M FRONT DISPLAY ASSY

SEMICONDUCTORS

	IC401	PE5420A
	Q484	2SA1037K
	Q442	DTC124EK
	D403	1SS355
	D401	DAN202K

COILS AND FILTERS

	L401	LFEA2R2J

CAPACITORS

	C482, C483	CCSRCH221J50
	C481	CCSRCH471J50
	C442	CEAL470M10
	C403	CEAT221M6R3
	C412	CEAT470M50
	C415, C454	CKSRYB102K50
	C401, C402, C410, C411, C419	CKSRYB103K50
	C441	CKSRYB103K50
	C418, C421	CKSRYB104K16
	C420	XCH3011

RESISTORS

	Other Resistors	RS1/16S###J

OTHERS

	X401 (5M-hz)	VSS1142
	401 Remote Receiver Unit	GP1UM28XK
	471 11P Cable Holder	51048-1100
	404 7P Cable Holder	51063-0706

Mark No.	Description	Part No.
	CN401 17P Cable Holder	52044-1745
	CN450 7P Jumper Connector	52151-0710
	V401 FL Tube	XAV3022

N R.ENCODER ASSY

SWITCHES AND RELAYS

	S511	VSG1024
	S513	XSX3005
	S512	XSX3006

OTHERS

	511 7P Cable Holder	51063-0705

O P.SW & FUNC. ASSY

SWITCHES AND RELAYS

	S501-S509	VSG1024

RESISTORS

	Other Resistors	RS1/16S###J

P FRONT KEY ASSY

SWITCHES AND RELAYS

	S451-S469	VSG1024

CAPACITORS

	C451-C453	CKSRYB102K50

RESISTORS

	Other Resistors	RS1/16S###J

OTHERS

	550 7P Cable Holder	51048-0700

Q H.P. ASSY

SEMICONDUCTORS

	Q1551, Q1552	2SC3326

CAPACITORS

	C1554, C1557	CCSRCH471J50
	C1553, C1556	CKSRYB103K50
	C1555, C1558	CKSRYB104K16
	C1551, C1552	CKSRYB223K50

RESISTORS

	⚠ R1553, R1554	RS1LMF151J
	⚠ R1551, R1552	RS2LMF391J
	Other Resistors	RS1/16S###J

OTHERS

	1551 6P Cable Holder	51048-0600
	JA1551 Headphone Jack	RKB1014
	KN1551 Earth Metal Fitting	VNF1084

R COMPONENT ASSY

SEMICONDUCTORS

	IC552	NJM2591M
	IC551	TC74HC4053AF
	D551, D552	1SS355

Mark No.	Description	Part No.
	CAPACITORS	
	C551-C554	CEAT101M10
	C555-C562, C566, C568	CKSRYB103K50
	RESISTORS	
	Other Resistors	RS1/16S###J
	OTHERS	
	CN551 5P Connector	52045-0545
	JA552 5P RCA Pin Jack	AKB7124
	JA551 6P RCA Pin Jack	XKB3025

FM/AM TUNER UNIT

FM/AM TUNER UNIT has no service part.

6. ADJUSTMENT

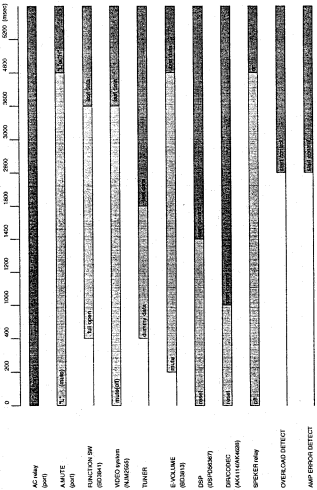
There is no information to be shown in this chapter.

7. GENERAL INFORMATION

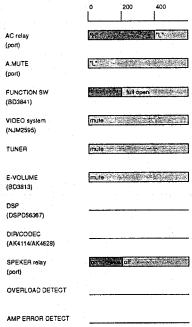
7.1 DIAGNOSIS

7.1.1 POWER ON AND OFF INITIAL TIMING CHART

■ POWER ON INITIAL TIMING CHART



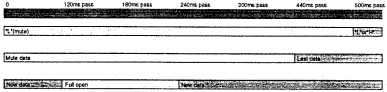
■ POWER OFF INITIAL TIMING CHART



7.1.2 IC DATA TRANSMISSION TIMING CHART

■ **IC data transmission timing chart**

1.When function chage



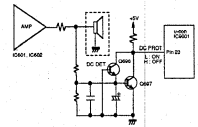
condition of mute cancel (system mute & E-volume mute)
1) when tuner mute during Tuner function
2) when communicate to DSP
3) when initial processing
4) when detect trouble of AMP DC
5) when detect overload of AMP
6) when Power off
7) when muting by key input

2.When except function chage

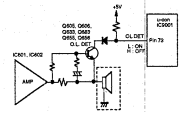
condition of mute cancel (system mute & E-volume mute)
1) when tuner mute during Tuner function
2) when communicate to DSP
3) when initial processing
4) when detect trouble of AMP DC
5) when detect overload of AMP
6) when Power off
7) when muting by key input

7.1.3 DETECTION CIRCUIT

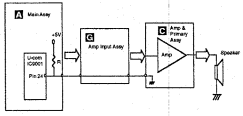
1.DC Detection Circuit Diagram:



2. Overload Detection Circuit Diagram:



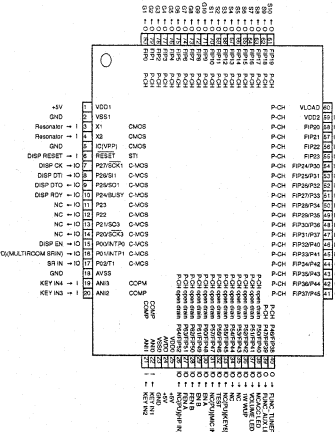
3. PCB Board Protection Circuit Diagram



■ PE5420A (FRONT ASSY : IC401)

• System Control MCU

■ Pin Arrangement (Top View)


+5V 1 VDD1
GND 2 VSS1
Resonator → I 3 X1 CMOS
Resonator ← I 4 X2 CMOS
GND 5 IC(VPP) CMOS
DISP RESET → I 6 RESET STI
DISP CK ↔ IO 7 P27/SCK1 C-MOS
DISP DTI ↔ IO 8 P26/SI1 C-MOS
DISP DTO ↔ IO 9 P25/SO1 C-MOS
DISP RDY ↔ IO 10 P24/BUSY C-MOS
NC ↔ IO 11 P23 C-MOS
NC ↔ IO 12 P22 C-MOS
NC ↔ IO 13 P21/SO3 C-MOS
NC ↔ IO 14 P20/SCK3 C-MOS
DISP EN ↔ IO 15 P00/INTP0 C-MOS
NC(P0)(MULTIROOM SRIN) ↔ IO 16 P01/INTP1 C-MOS
SR IN → IO 17 P03/T1 C-MOS
GND 18 AVSS
KEY IN4 → I 19 AIN3 COMP
KEY IN3 → I 20 AIN2 COMP
P-CH VLOAD 60 VF
P-CH VDD2 59 IO ↔ +5V
P-CH FIP0 58 IO ↔ S11
P-CH FIP1 57 IO ↔ S12
P-CH FIP2 56 IO ↔ S13
P-CH FIP3 55 IO ↔ S14
P-CH FIP24/P30 54 IO ↔ S15
P-CH FIP25/P31 53 IO ↔ S16
P-CH FIP26/P32 52 IO ↔ S17
P-CH FIP27/P33 51 IO ↔ S18
P-CH FIP28/P34 50 IO ↔ S19
P-CH FIP29/P35 49 IO ↔ S20
P-CH FIP30/P36 48 IO ↔ S21
P-CH FIP31/P37 47 IO ↔ S22
P-CH FIP32/P40 46 O ↔ FUNC_VIDEO LED
P-CH FIP33/P41 45 O ↔ FUNC_VCR/DVR LED
P-CH FIP34/P42 44 O ↔ FUNC_TV/SAT LED
P-CH FIP35/P43 43 O ↔ FUNC_DVD/LD LED
P-CH FIP36/P44 42 O ↔ FUNC_CD LED
P-CH FIP37/P45 41 O ↔ FUNC_CDR/TAPE LED

• Pin Function

No.	Port	Pin Name	I/O	Pin Function
1	VDD1	+5V	-	positive power supply
2	VSS1	GND	-	ground potential
3	X1	Resonator	I	crystal connection for system clock oscillation
4	X2	Resonator	I	crystal connection for system clock oscillation
5	IC(VPP)	GND	-	
6	RESET	DISP RESET	I	receive reset signal from main u-com
7	P27/SCK1	DISP CK	I/O	clock signal from main u-com
8	P26/SI1	DISP DTI	I/O	datain from main u-com
9	P25/SO1	DISP DTO	I/O	data out to main u-com
10	P24/BUSY	DISP RDY	I/O	ready signal from main u-com
11	P23	NC	I/O	
12	P22	NC	I/O	
13	P21/SO3	NC	I/O	
14	P20/SCK3	NC	I/O	
15	P00/INTP0	DISP EN	I/O	enable signal from main u-com
16	P01/INTP1	NC	I/O	
17	P03/T1	SR IN	I/O	remote control signal input from main room
18	AVSS	GND	-	ground potential for A/D converter
19	AIN3	KEY IN4	I	
20	AIN2	KEY IN3	I	
21	AIN1	KEY IN2	I	
22	AIN0	KEY IN1	I	
23	VSS0	GND	-	ground potential for ports
24	AVDD	+5V	-	analog power voltage input to A/D converter
25	VDD0	+5V	-	positive power supply to ports
26	P64/FIP52	NC	I/O	
27	P63/FIP51	FEN A	I/O	MULTI JOG(Right)
28	P62/FIP50	FEN B	I/O	MULTI JOG(Left)
29	P61/FIP49	EN B	I/O	VOLUME JOG1(-)
30	P60/FIP48	EN A	I/O	VOLUME JOG1(+)
31	P57/FIP47	NC	I/O	
32	P56/FIP46	TEST	I/O	test mode input for checker
33	P55/FIP45	NC	I/O	
34	P54/FIP44	NC	I/O	
35	P53/FIP43	NC	I/O	
36	P52/FIP42	1W WUP	I/O	output wakeup signal to main u-com
37	P51/FIP41	VOL LED	I/O	LED Output
38	P50/FIP40	MCACC LED	I/O	LED Output
39	P47/FIP39	FUNC/AUX	O	LED Output
40	P46/FIP38	FUNC_TUNER	O	LED Output

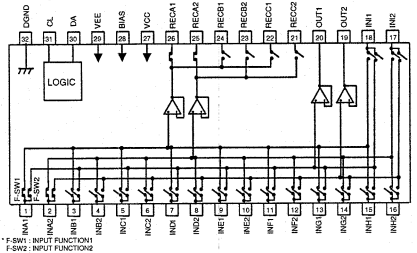
• Pin Function

No.	Port	Pin Name	I/O	Pin Function
41	FIP37/P45	FUNC_CDR	O	LED Output
42	FIP36/P44	FUNC_CD	O	LED Output
43	FIP35/P43	FUNC_DVD	O	LED Output
44	FIP34/P42	FUNC_TV	O	LED Output
45	FIP33/P41	FUNC_VCR	O	LED Output
46	FIP32/P40	FUNC_VIDEO	O	LED Output
47	FIP31/P37	S22	I/O	Display
48	FIP30/P36	S21	I/O	Display
49	FIP29/P35	S20	I/O	Display
50	FIP28/P34	S19	I/O	Display
51	FIP27/P33	S18	I/O	Display
52	FIP26/P32	S17	I/O	Display
53	FIP25/P31	S16	I/O	Display
54	FIP24/P30	S15	I/O	Display
55	FIP23	S14	O	Display
56	FIP22	S13	O	Display
57	FIP21	S12	O	Display
58	FIP20	S11	O	Display
59	VDD2	+5V	-	positive power supply to FIP controller.
60	VLOAD	VF	-	pull down resistor connection of FIP controller
61	FIP19	S10	O	Display
62	FIP18	S9	O	Display
63	FIP17	S8	O	Display
64	FIP16	S7	O	Display
65	FIP15	S6	O	Display
66	FIP14	S5	O	Display
67	FIP13	S4	O	Display
68	FIP12	S3	O	Display
69	FIP11	S2	O	Display
70	FIP10	S1	O	Display
71	FIP9	G10	O	Display
72	FIP8	G9	O	Display
73	FIP7	G8	O	Display
74	FIP6	G7	O	Display
75	FIP5	G6	O	Display
76	FIP4	G5	O	Display
77	FIP3	G4	O	Display
78	FIP2	G3	O	Display
79	FIP1	G2	O	Display
80	FIP0	G1	O	Display

■ BD3841FS (MAIN ASSY : IC101)

• 9ch Function Switch

■ Block Diagram



* F-SW1 : INPUT FUNCTION1
F-SW2 : INPUT FUNCTION2

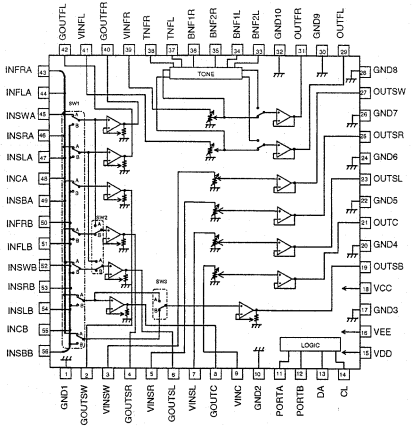
• Description of terminal

Terminal Number	Terminal Name	Description	Terminal Number	Terminal Name	Description
1	INA1	A 1ch input terminal	17	INI2	I 2ch input terminal
2	INA2	A 2ch input terminal	18	INI1	I 1ch input terminal
3	INB1	B 1ch input terminal	19	OUT2	2ch output terminal
4	INB2	B 2ch input terminal	20	OUT1	1ch output terminal
5	INC1	C 1ch input terminal	21	RECC2	C 2ch REC output terminal
6	INC2	C 2ch input terminal	22	RECC1	C 1ch REC output terminal
7	IND1	D 1ch input terminal	23	RECB2	B 2ch REC output terminal
8	IND2	D 2ch input terminal	24	RECB1	B 1ch REC output terminal
9	INE1	E1ch input terminal	25	RECA2	A 2ch REC output terminal
10	INE2	E 2ch input terminal	26	RECA1	A 1ch REC output terminal
11	INF1	F 1ch input terminal	27	VCC	(+)Power supply terminal
12	INF2	F 2ch input terminal	28	BIAS	Bias input terminal
13	ING1	G1ch input terminal	29	VEE	(-)Power supply terminal
14	ING2	G2ch input terminal	30	DA	Serial data an/atch input terminal
15	INH1	H 1ch input terminal	31	CL	Serial clock input terminal
16	INH2	H 2ch input terminal	32	DGND	Digital ground terminal

■ BD3813KS (MAIN ASSY : IC108)

- 8.1ch Audio Sound Processor

■ Block Diagram



• Description of terminal

Terminal Number	Terminal Name	Description	Terminal Number	Terminal Name	Description
1	GND1	Ground terminal	14	CL	Serial clock input terminal
2	GOUTSW	Sub woofer input gain output terminal	15	VDD	Power supply terminal for port
3	VINSW	Subwoofer volume input terminal	16	VEE	(-)Power supply terminal
4	GOUTSR	Surround Rch input gain output terminal	17	GND3	Ground terminal
5	VINSR	Surround Rch volume input terminal	18	VCC	(+)Power supply terminal
6	GOUTSL	Surround Lch input gain output terminal	19	OUTSB	Surround backoutput terminal
7	VINSL	Surround Lch volume input terminal	20	GND4	Ground terminal
8	GOUTC	Center speakerinput gain output terminal	21	OUTC	Center speaker output terminal
9	VINC	Center speaker volume input terminal	22	GND5	Ground terminal
10	GND2	Ground terminal	23	OUTSL	Surround Lch output terminal
11	PORTA	Output terminal for port	24	GND6	Ground terminal
12	IPORTB	Output terminal for port	25	OUTSR	Surround Rch output terminal
13	DA	Serial data and latch input terminal	26	GND7	Ground terminal

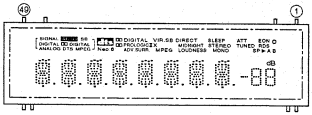
Terminal Number	Terminal Name	Description	Terminal Number	Terminal Name	Description
27	OUTSW	Sub woofer output terminal	42	GOUTFL	Lch input gain output terminal
28	GND8	Ground terminal	43	INFRA	Rch DVD inputterminal
29	OUTFL	Lch output terminal	44	INFLA	Lch DVD input terminal
30	GND9	Ground terminal	45	INSWA	SWch DVD input terminal
31	OUTFR	Rch output terminal	46	INSRA	SRch DVD input terminal
32	GND10	Ground terminal	47	INSLA	SLch DVD input terminal
33	BNF2L	Lch bass filter terminal 2	48	INCA	Cch DVD input terminal
34	BNF1L	Lch bass filter terminal 1	49	INSBA	SBch DVD input terminal
35	BNF2R	Rch bass filter terminal 2	50	INFRB	Rch DSP input terminal
36	BNF1R	Rch bass filter terminal 1	51	INFLB	Lch DSP input terminal
37	TNFL	Lch treble filter terminal	52	INSWB	SWch DSP input terminal
38	TNFR	Rch treble filter terminal	53	INSRB	SRch DSP input terminal
39	VINFR	Rch volume Input terminal	54	INSLB	SLch DSP input terminal
40	GOUTFR	Rch input gain output terminal	55	INCB	Cch DSP input terminal
41	VINFL	Lch volume Input terminal	56	INSBB	SBch DSP input terminal

7.2.2 DISPLAY

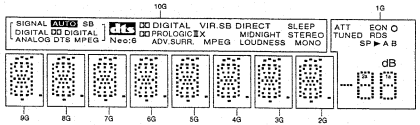
■ XAV3022 (FRONT ASSY : V401)

• FL DISPLAY

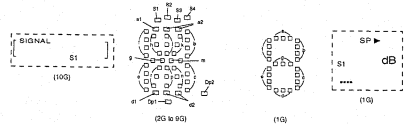
• Pin Assignment



• Grid Assignment



• Segment Designation



• Pin Connection

Pin No.	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
Connection	F2	F2	NP	NP	P22	P21	P20	P19	P18	P17	P16	P15	P14	P13	P12	P11	P10	P9	P8	P7	P6	P5	P4	P3	P2
Pin No.	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
Connection	P1	NX	NX	NX	NX	NX	NX	NX	NX	NX	NX	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G	NP	NP	F1	F1

NOTE 1) F1, F2..... Filament
2) NP..... No pin
3) NX..... No extand pin
4) DL..... Datum Line
5) 1G to 10G..... Grid
6) Field of vision is a minimum of 21.8° from the lower side.

• Anode Connection

	10G	9G-2G	1G
P1	S1	s1	ATT
P2	AUTO	a2	EON
P3	SB	h	○
P4	DIGITAL	j	TUNED
P5	ANALOG	k	RDS
P6	DIGITAL (L)	b	S1
P7	DTS	f	A
P8	MPEG (L)	m	B
P9		g	1a
P10	MPEG (R)	c	1b
P11	DIGITAL (R)	e	1f
P12	PROLOGIC IIx	r	1g
P13	Neo:6	p	1c
P14	VIR.SB	n	1e
P15	ADV.SURR.	d1	1d
P16	X	d2	2a
P17	DIRECT	Dp2	2b
P18	MIDNIGHT	Dp1	2f
P19	LOUDNESS	S1	2g
P20	SLEEP	S4	2c
P21	STEREO	S2	2e
P22	MONO	S3	2d